0 FIFTIETH ANNIVERSARY YEAR December 14, 1974

Saturday Review World

AN INVENTORY OF HOPE

a special double year-end issue devoted in its entirety to

THE RESTORATION OF CONFIDENCE

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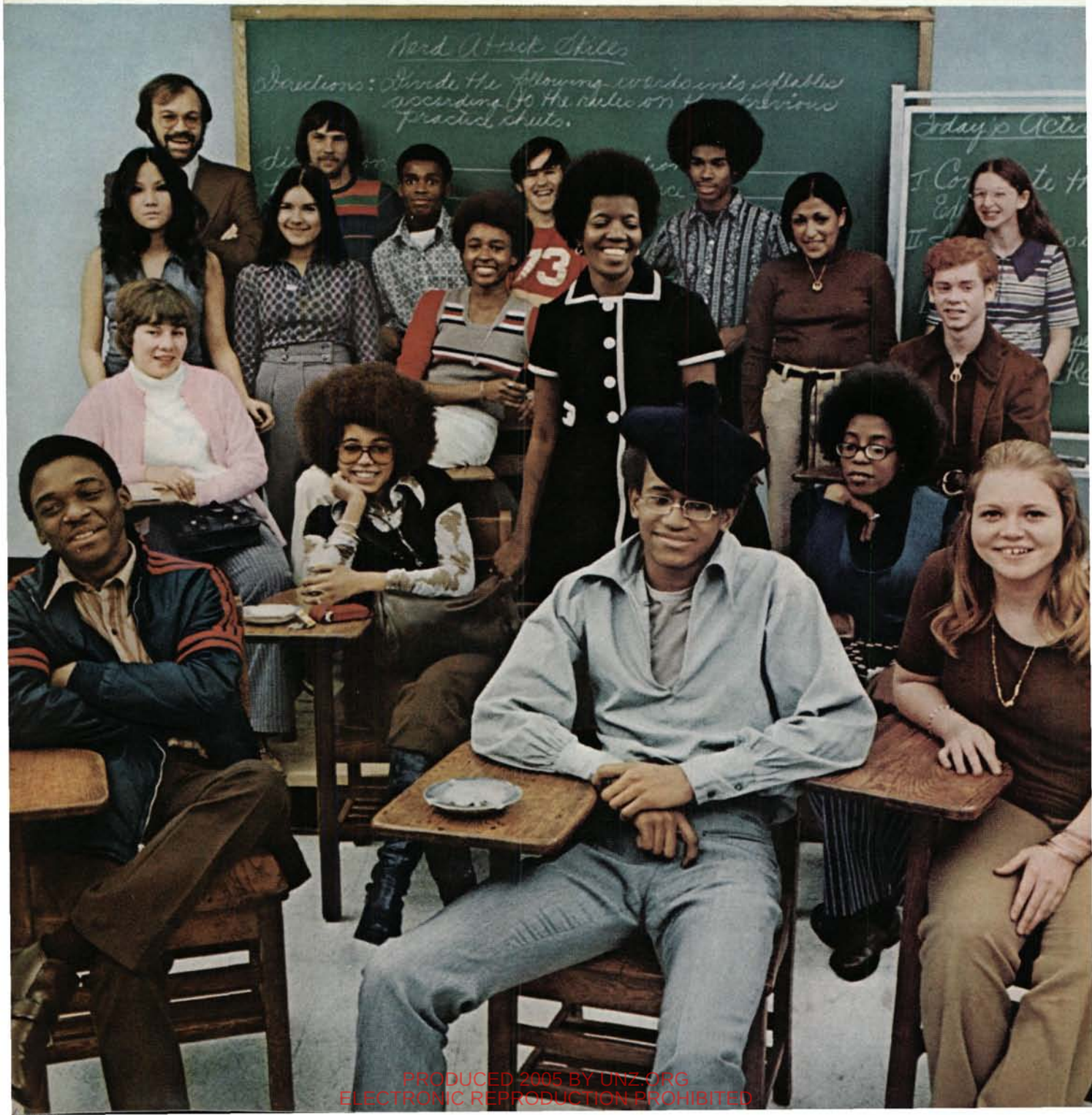

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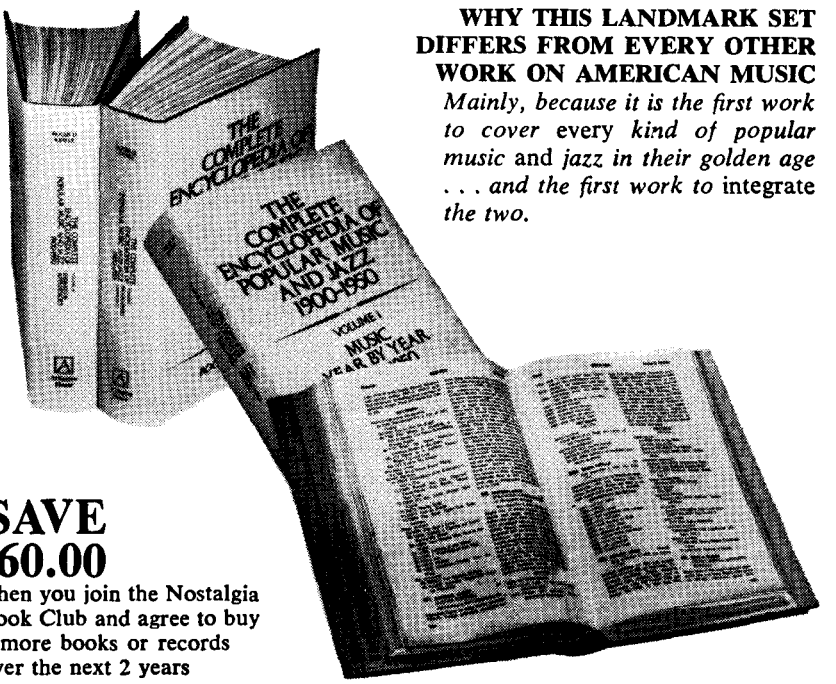

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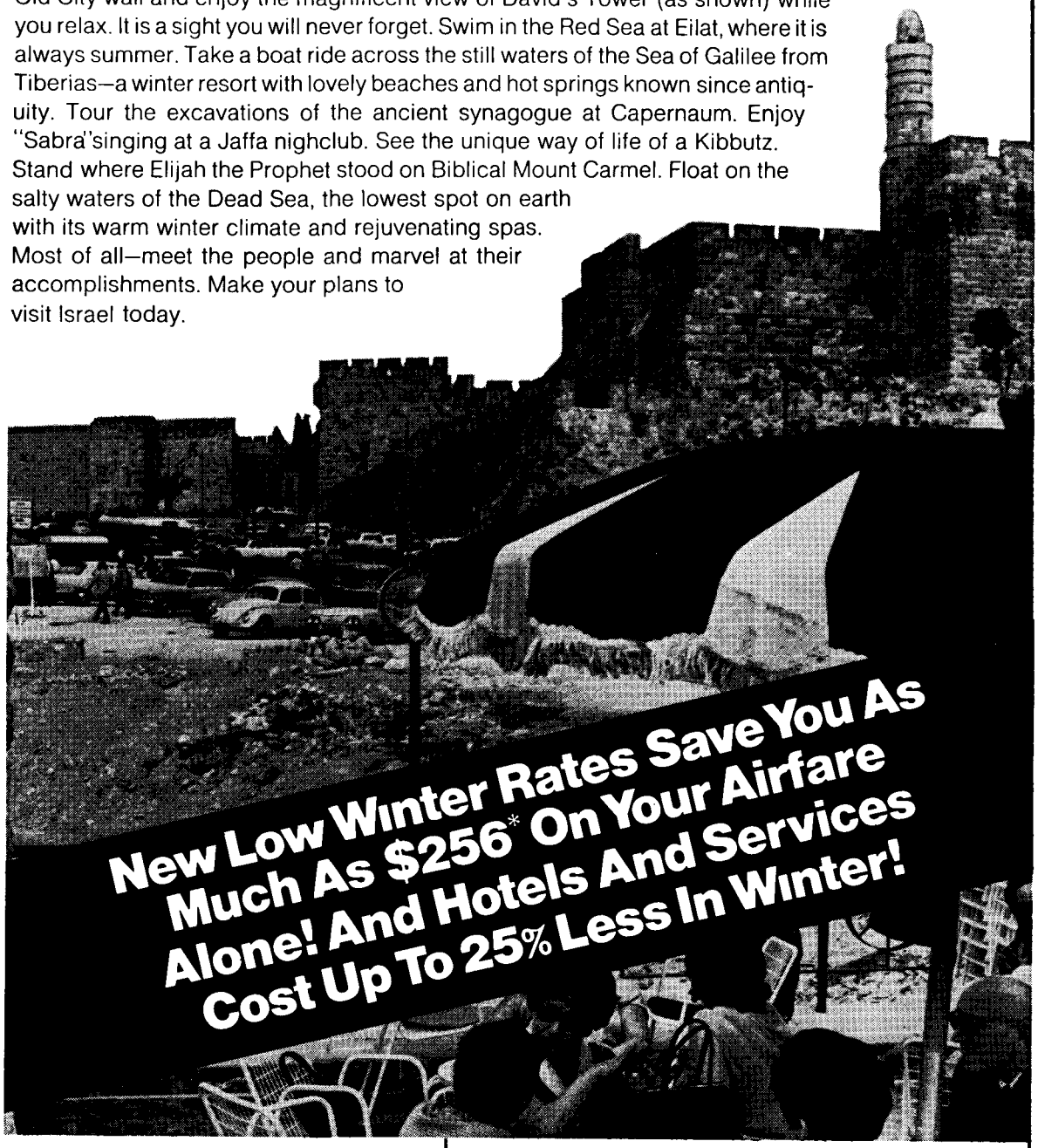

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Hope and Practical Realities

The purpose of this special issue is to examine and, if possible, to cut into the gloom that has settled over the nation. In the present mood, it is not likely that any serious problems will be imaginatively approached, much less solved. The main trouble with despair is that it is self-fulfilling. People who fear the worst tend to invite it. Heads that are down can't scan the horizon for new openings. Bursts of energy do not spring from a spirit of defeat. Ultimately, hopelessness leads to helplessness.

In this sense, the most serious problem confronting the nation is not inflation or the energy shortage or dwindling resources or the danger of war in the Middle East. The most serious problem right now is that the American people are psychologically depleted and are not primed for innovation. Where does new hope begin? It is possible that hope in America begins with a restoration of confidence—confidence of the American people in themselves, in their government, in their future.

The reasons for the decline of confidence are not obscure. For more than a decade, the nation has experienced an almost relentless series of events that have cut deeply into the national sense of a favored destiny. The traditional American belief that heroes appear at moments of overwhelming need has been shattered. The assassination of John and Robert Kennedy still lies like an incubus on the land. The spew of violence has spilled over into everyday life.

THE DOMINANT THEMES of the decade have been Vietnam and Watergate, both of which came off the same spool and underlined history's oldest lesson—that power and morality tend to be on opposite sides and that, indeed, morality is the first casualty of power. In Vietnam commitments were made, and actions were taken, outside the constitutional process. The arbitrary use of presidential power was escalated to keep pace with the war itself—a war that was to drive a wedge of distrust between the American people and their government. It was a war that was dubious in its origins, furtive in its operations, murky in its purposes.

Watergate compounded the distrust. As with Vietnam, failure to admit an initial error billowed out into larger errors and wrongdoing. The Watergate process continued until there was no way out except for the President to resign in disgrace—the first such withdrawal in the nation's history. What began as an idiotic act of political sabotage burgeoned into a political convulsion. The effects are not confined to the disappearance from the political scene of those directly involved, as the recent elections have demonstrated.

Yet, in the perspective of American history, both Vietnam and Watergate have served to strengthen the underpinnings of American society. The basic theory that went into the making of the American government has been confirmed. This theory is that the worth of a government is measured by its ability to face up to its errors. The American system was designed to force errors into the open and to make it as difficult as possible for the error-makers to maintain their power. The Philadelphia Constitutional Convention gave office-holders substantial power to meet the needs of the people but carefully limited the power of office-holders to isolate themselves from the consequences of their mistakes.

Both Vietnam and Watergate, therefore, crushing though they have been to national pride and confidence, have demonstrated the validity of the original design of the government. Some Presidents may arrogate power to themselves in the name of the national security—whether for personal or even altruistic purposes—but the process is as risky to them politically as it is alien to the traditions of the society.

Vietnam was one of the greatest ordeals in the nation's history, and Watergate was unquestionably the greatest political scandal, but both episodes demonstrated the principle that the ultimate power of the society rests with the people. For it was an activated public opinion—public opinion interacting with investigative reporting and with the workings of Congress—that forced an end to the Vietnam war and that shattered the attempt of President Nixon to quash the Watergate investigation.

Whatever the historical verdict may be on the Vietnam war, the signal fact emerging from that experience is that the United States declined to use the means readily at hand to obliterate its foe. The United States did not exercise that power because of the greater power represented by the certain and overwhelming opposition of the American people to such a course and the inevitable political demise of all those who would have been responsible for such a decision.

Similarly, what is most significant about Watergate is not the enormity of the scandals, but the fact that not even a President could quarantine damaging information in his possession. The recurrent tone in most foreign comment on Watergate was one of astonishment

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that the government should be prosecuting the government. Newspapers abroad reported the news that members of the Attorney General's staff were investigating the role of the White House with respect to the original break-in and the subsequent attempt to bribe the convicted burglars into maintaining silence about the identity of their employers. The editorial pages of those newspapers, however, reflected consternation or disbelief that people who were appointed by the President should be conducting the investigation and preparing the way for criminal trials of some of the highest officials in the land. Nor was it readily comprehensible to the readers of those newspapers why anything as imprecise as public opinion should have been able, on a day-to-day basis, to force the President to make decisions counter to his own personal interests.

Both Watergate and Vietnam have served as a classroom on the nature of American institutions. Much has been learned. More remains to be learned. And of all the lessons, none is more important than the fact that this system was built to withstand shock, and that moral factors have a place in that equilibrium. This lesson can be useful in enabling Americans to regain confidence in themselves and their institutions. Such confidence will be essential if they are to meet present and future challenges.

Nothing would be more fatuous than to suppose these problems have easy answers, or that a Pollyanna attitude is all that is necessary for resolving them. Here we borrow freely from an editorial appearing on this page several years ago. The evidence is strong—not just in this country but throughout a large part of the world—that human society is in a stage of comprehensive breakdown. Life is no longer the highest value. Sensitivity to suffering and to indignity is being dulled. People adjust all too easily to brutality and violence. Poverty no longer ignites general resentment. The need for social justice fails to galvanize. Millions of young people and increasing numbers of older people find it necessary to subject their delicate brain tissue to the twisting power of drugs. The large cities are rapidly on the way to becoming unlivable.

Nothing, however, is more grimly characteristic of the age than the fact that the finest minds are not being directed to the biggest problems. Brains are being honed and mobilized for purposes of confrontation and destruction. No comparable mobilization of human intellect and conscience is occurring on the level of humanity's greatest needs.

Organizations like the Club of Rome have turned to the computer for projections about the future of humankind. They have fed into the computer vast quantities of statistics on population, food, resources, environment, industrial growth, and so forth. And the computer has responded with an ominous projection of a world overrun with people, short on habitable land and food, its resources rapidly being depleted, its oceans and airshed heavy with poisons.

Nothing would be more dangerous than to ignore such warnings. But nothing is more irresponsible than to accept the computer's projection as inevitable. The computer can't be programmed to comprehend the mysteries of human response. The computer has no way of anticipating the advent of a Thomas Jefferson or a Winston Churchill or anyone capable of generating ideas that can lead to great change. Can the computer tell us anything about a mind like Bucky Fuller's—a mind that can conceive of new sources of energy, new ways of building homes and cities, new ways of making the earth more livable?

THE CASE FOR HOPE has never rested on provable facts or rational assessment. Hope by its very nature is independent of the apparatus of logic. What gives hope its power is not the accumulation of demonstrable fact, but the release of human energies generated by the longing for something better. The capacity for hope is the most significant fact in life. It gives human beings a sense of destination and the energy to get started. It enlarges sensitivities. It gives values to feelings as well as to facts.

Hope cannot be ordered into being. Men in a condition of despair cannot be commanded to generate glorious dreams. But they can be encouraged to rediscover themselves and to be reminded of past achievements under circumstances of enormous difficulty. They can be given confidence in the naturalness of their visions and in the reach of the human mind.

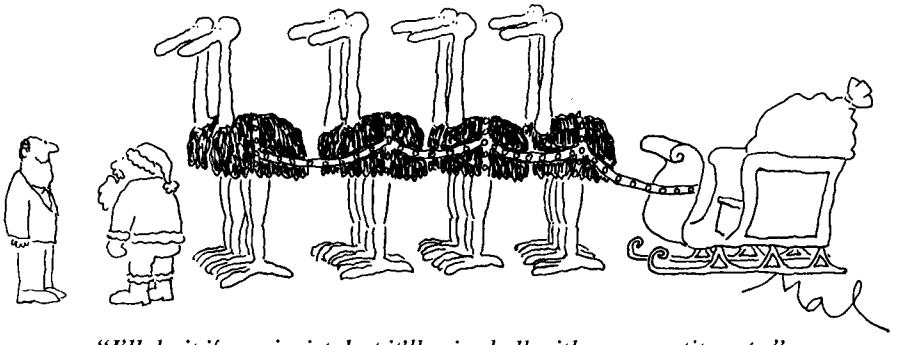
Human despair or default can reach a point, of course, where even the most stirring visions lose their regenerating and radiating powers. This point, some will say, has already been reached. Not true. It will be reached only when human beings are no longer capable of calling out to one another, when the words in their poetry break up before their eyes, when their faces become frozen toward their young, and when they fail to make pictures out of clouds racing across the sky.

Much of the present despair will lift when we realize we are not living up to our moral capacity. No other country in the world has more to bring to its problems. We have the brainpower. We have the manpower. We have the technology. What we don't have, but can regain, is confidence in ourselves, in our history, and in the ultimate power of ideas.

The pages that follow do not add up to a comprehensive prescription for curing all the ills in the world. But they do give evidence that intelligence and the spirit of adventure can be combined to create new energies, and that out of those energies may come exciting and rewarding new prospects. N.C.

NOTICE TO READERS

With the first issue of 1975, which will be dated January 11, the name of the magazine will be simplified and will revert to its long-standing title, *Saturday Review*. The restoration of the old title marks no change in policy. The emphasis on world needs and world progress will be continued. The name of the publishing company will remain Saturday Review/World, Inc.



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The Case for Optimism

We do face risks for survival, but if we change course, there are probabilities of a decent life for all people. Here are 10 major steps that must be taken now.

by Maurice Strong

Are we headed for planetary doomsday? Is the human prospect as bleak and unpromising as the prophets of doom suggest? I believe that there is a *case for hope*, that doomsday is not inevitable.

• There is hope in the dawning realization of our basic interdependence in caring for and sharing the world's precious resources.

• There is hope in the attitudes of young people, in their questioning of the competitive, materialistic values of our society, in their awakened sensitivities to its inequities and injustices.

• There is hope in the courageous experimentation of some people, particularly youth, with new, simpler, more human life-styles, which are pioneering new concepts of growth and alternatives to traditional development patterns.

• There is hope in the growing number of positive examples of the way the creative uses of technology, combined with political will, can indeed produce a better and more livable environment.

• There is hope in many parts of the developing world where traditional values and cultures have been harmonized with modern technology to permit the achievement of a quality of life that is in no way inferior to that enjoyed by the wealthier societies and in many ways has much to teach them.

• There is hope in the nature of man himself, man at his best, and in the evidence in our past that we can and do respond to appeals to our higher values and our larger concepts of enlightened self-interest.

I am fully persuaded that the case for hope must begin with a realistic acknowledgment of the fact that we do indeed face risks to our survival and, perhaps more importantly, to the survival of the qualities and values which endow human life with its higher purposes and meaning. Doomsday is possible—even probable—if we continue on our present course, but it is not inevitable. It is possible to opt for a future of unparalleled promise and opportunity for the human species. But this future can come about only if we make a radical change in our present course.

The same science and technology that has given us the power to effect such a destructive impact on our natural environment and resources can help provide the means not only to control that impact but also to give all people access to at least the basic requirements for a decent life.

Let me set out 10 major steps that I believe we must take to achieve this end:

A New Approach to Societal Decision-Making. Our present dilemma points up serious deficiencies in societal decision-making processes. Clearly, our past decisions have not been producing the results we expected. No one consciously decided to pollute our air or waters, to produce the urban squalor that afflicts so many of our cities, to destroy so much of our natural endowment of plant and animal life, and to produce the glaring disparities between rich and poor that characterize our global society. But, nevertheless, these conditions now confronting us are the products of our past actions—the unforeseen results of decisions taken to meet other narrower, short-term objectives.

It is evident that we must develop better methods of evaluating the full consequences of those decisions which significantly affect both the physical and the social environment—before such decisions are made.

Societal management in the environmental age requires prime emphasis on the management of the whole system of relationships of the individual activities that combine to affect man's own development and well-being. This approach will assume even more importance than

Maurice Strong is Secretary-General of the U.N. Conference on the Human Environment and former president of the Canadian International Development Agency.

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the management of any individual activity within the system. It also will require that we develop better techniques of allocating the real costs of activities to those who benefit from them, of assigning real value to such traditionally free goods as water and air. It means drastically revising our concepts and methods of evaluating the future. If we continue to value the future by means of present methods of discounting future values at current interest rates, it would not be good economics to preserve the oceans, the atmosphere, and the other precious resources of our "only one earth."

STABILIZING WORLD POPULATION. This goal should be achieved quickly in the industrialized countries that are already moving in that direction—and at the earliest feasible date in most other countries. The timing of population stabilization will vary considerably from country to country, reflecting the very different situations that exist in the balance among population, resources, and development goals. But it is essential that on a global basis the goal must be to stabilize population growth by the first quarter of the next century. Stabilization will be difficult to achieve in the developing countries in particular. Some of them are already facing the prospect of population limitation through famine and disease, and these forbidding prospects will undoubtedly accelerate if efforts to limit population in more humane ways prove too little or too late. Zero growth can be brought about only by increasing the incentives for reducing family size by spreading the benefits of development more widely and by evolving improved techniques of family planning for those thus motivated to use them.

In an era when the borders of the world are closed to large-scale immigration, the population growth of each nation is first and foremost a matter of its own responsibility; the economic and social pressures it creates and the effect on development goals primarily affect its own national situation. The population of individual nations becomes a world concern when its activities and needs begin to impinge on the resources and rights of others, whether as a result of increased population growth or the increased demands of existing populations. This situation is clearly going to happen in many cases—in some cases it is already happening. Therefore, to say that population is first and foremost a national responsibility does not relieve us of the need to see it as a global concern.

Joseph Scrofani

"Creation of a new international economic order" in which "civilization is char

REDUCING DEMAND ON NATURAL RESOURCES AND ENVIRONMENT—A NEW COMMITMENT TO CONSERVATION. The consumption habits and production methods, particularly in the industrialized societies, must be significantly altered to reduce the demand on scarce resources and pressures on the natural environment. It must go far beyond the development of "add on" pollution-control technologies to the redesign of industrial systems and a much broader distribution of industrial capacity. Energy conservation in particular is a high priority. The fact that Sweden, whose standard of living is comparable to that of the United States, has a per capita energy use only about half that of the United States illustrates the fact that significant reductions can be effected in energy use without materially affecting living standards. Indeed better use of resources and care of the environment can be accompanied by significant increases in the real quality of life. Consumers must be prepared to modify their demands, particularly for the kind of variety in consumer products that represents differences in packaging and presentation more than in substance. Consumers must also be prepared to accept the higher prices that will be necessary for assuring that product costs incorporate fully the cost of the environmental protection to which they give rise.

The ethic of abundant resources must give way to the ethics of scarcity and

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zed by a network of interdependencies, global in scale," can save the future.

conservation. Higher costs provide greater incentives for the development of more efficient methods of using and reusing natural resources. Greater emphasis must be placed on the development of less-energy-intensive technologies, more closed-system methods, low-entropy and recycling technologies.

INCREASING WORLD FOOD SUPPLY WITHOUT DESTROYING THE ECOLOGICAL BASIS FOR SUSTAINED PRODUCTION. Feeding the world's growing population and achieving adequate nutritional standards is one of the most urgent issues of our generation. But this goal must be accomplished without destroying the ecological basis on which sustained production of food depends. Ecologically sound management of productive agricultural land is absolutely indispensable to meeting the world's food-supply problems on a long-term basis. Use of fertilizers and chemical pesticides should be carefully controlled to assure a maximum contribution to increased food production and a minimum of risks of secondary consequences that could largely offset or wholly negate the benefits of such increases. We must arrest the tragic loss of productive agricultural land through the march of the deserts, massive soil erosion, and salination caused by the mismanagement of man's activities. We must make more effective use of human, animal, and other organic wastes as fertilizers and develop more effective non-chemical methods of pest control. We must drastically reduce large-scale losses of food grains during storage, processing, and handling, which approach one-third of the total harvested in some developing countries. We should maintain reserves, stocks of food, and other vital resources in quantities sufficient for meeting foreseeable emergencies. This should be done, as is being proposed with respect to food in relation to the World Food Conference, under a system of shared international responsibility, both for costs and resource use.

REDIRECTING THE URBAN REVOLUTION. The industrialized countries first made the fundamental transition from a primarily rural to a largely urbanized society, and now the developing countries are doing so. This transition is both a product of our new technological civilization and the focus of many of its dilemmas. Urban areas have, on the whole, been growing at rates about double those of overall population growth. In 1950 there were 75 cities with a million or more inhabitants and a total population of 174 million; in 1970 there were 162 such cities, including four that had 10 million or more inhabitants, and the total population was 416 million; it is estimated that by the year 1985 there will be 273 cities with 1 million or more inhabitants, including 17 with over 10 million, and the total population will be 805 million. In some areas eco-disasters of major proportions are shaping up as cities are faced with the prospects of being overwhelmed by the virtually unmanageable problems of meeting the basic needs of their exploding populations.

Some countries, notably China, have succeeded in limiting the growth of their cities and in achieving a workable balance between rural and urban growth patterns. This is a balance that all countries must ultimately achieve, because present rates of urban growth are simply not sustainable in the long term.

Urban growth, which depends on a high degree of concentration and centralization, must give way to the development of networks of sustainable urban "ecosystems," which are in harmony with the resource base on which they depend. The sharp distinctions between rural and urban life will have to disappear as rural life acquires many of the advantages and attributes now found in urban areas and as the advantages of rural life become more accessible to inhabitants of urban areas. These new developments will entail a wholly new and

(Continued on next page.)

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Wide World

Life on the Commune—*"Youth with new, simpler, more human life-styles."*

Life in the City—*"Consumers must modify demands for variety in products."*

Annan

integrated approach to the planning and management of human settlements.

ORGANIZATION AND REORIENTATION OF SCIENCE AND TECHNOLOGY. Just as man's mastery of science and technology has helped to produce many of his present difficulties, the power of science and technology must now be consciously evoked if he is to deal effectively with these difficulties. A large-scale redirection of research and development expenditures and a reorientation of the priorities of science and technology is essential. That will involve a reshaping of policies and incentives to harness the resources of industrial corporations, which are the leading repositories and practitioners of the world's technology, and to assure that they are directed to the achievement of the social goals of society.

There must also be a much more effective relationship between scientists and technologists on the one hand and political decision-makers on the other. Specifically, better means must be provided for advising and guiding scientists and technologists concerning decisions that shape our environmental future. Scientists and technologists must play a major part in reshaping the societal decision-making processes to which I have already referred.

A shift of some of the very large expenditures now being made on resource and development for military purposes to a budget favoring technologies for environmental control and betterment would improve, not diminish, our basic security. For the pursuit of narrow concepts of military security at the expense of the environmental security on which the future of all depends is surely illusory.

A NEW APPROACH TO GROWTH. New concepts of growth must be elaborated that give primacy to man's social goals and aspirations and assure that economic development is clearly designed to achieve these goals. This means that new models for economic and social progress must be designed. In the industrialized world this will involve alternative lifestyles and patterns of consumption oriented more to quality and non-material satisfactions and less to sheer quantity.

Economic incentives and penalties must be reoriented to make it more attractive to engage in those activities that are socially desirable, and less attractive to undertake those that impinge on or

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contradict social goals. The highly industrialized societies should generally forgo the temptation for ever greater growth measured in traditional material terms. Most new industrial development should take place in underdeveloped regions, not in the already heavily industrialized areas.

New directions for growth in the developing nations should be designed to bypass the errors and excesses of societies that were industrialized earlier. The need for diversity in patterns of development should be recognized and respected as well as each nation's right to self-reliance in choosing its own development goals and means of achieving them.

MANAGEMENT AND CARE OF THE OCEANS. One of the greatest challenges of all time and certainly one of the greatest facing this generation is the task of bringing the 70 percent of the globe represented by the oceans out of national jurisdiction and under the rule of law and management. And the way in which we meet this challenge will do much to determine the future prospects for world peace and order. Within the foreseeable future many of the activities of man that have traditionally been carried out on land will be capable of being carried out on the oceans—some of them amounting in effect to the creation of man-made territory.

This great new source of wealth must not become the object of a new round of fierce competition among the wealthy countries with the technologies to exploit them, nor the basis of a new form of exploitation in which the wealthy extract a disproportionate share of the benefits at the expense of the poor. Resources of the oceans, and particularly of those that lie beyond national jurisdictions, must be subjected to effective international management and control so as to assure that the majority living in the developing world are the principal beneficiaries of these resources.

CREATION OF A NEW INTERNATIONAL ECONOMIC ORDER. The technological civilization is characterized by a network of interdependencies that is global in scale. The cooperation of the poor is clearly necessary for the effective functioning of this society. At the same time, the rich are most acutely vulnerable to the kinds of disruption of the technological society that can now be effected by relatively small groups of desperate people. Thus enlightened self-interest reinforces basic moral and ethical considerations in dictating that the benefits of the technological society be more widely and equitably shared.

In effect, we must extend into international life the principles of distributive justice and minimum opportunities for all that are accepted as the basis for relations between rich and poor in most national societies today. This means a vast increase in the flow of resources between rich and poor countries, not merely on the basis of charity, but as a precondition to the kind of basic economic security which is essential to the health and stability of a functioning world system. And it will mean replacement of traditional development aid programs with more automatic and impersonal methods of transferring resources, such as use of special drawing rights and levies, tolls, or user charges on the use of the global commons of oceans and atmosphere and possibly on the utilization of non-renewable resources.

REVOLUTION IN VALUES AND BEHAVIOR. It must be evident that all the foregoing proposals will require significant changes in our present system of values and patterns of behavior. The principal changes must be made in the industrial world, which today commands such a disproportionate share of the wealth and power that this technological society has made possible. The Western world needs its own form of "cultural revolution"—and it needs it urgently.

I am well aware that most of the proposals I have just advanced seem incompatible with present political realities. But let us be reminded that political realities are not immutable; there are times when practical needs must be shaped to match political realities, but on occasion these needs are such as to compel existing political realities to give way to new and larger realities.

We must believe that it is possible to build a new foundation of political will based on the combination of man's higher moral precepts and enlightened awareness of his larger self-interest. If the task is monumental, the stakes are even more so. At risk is the human future. I believe we still have the capacity to shape that future. But I am equally convinced that it will be determined largely by what we decide or fail to decide in the next decade. □

"Do you have a card for somebody whose analyst is on vacation?"

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Marc & Evelyne Bernheim for The Rockefeller Foundation

I HAVE A PLAN

A former Secretary of Agriculture introduces an innovative scheme for averting the threat of famine until we can achieve zero growth and zero waste.

by Orville Freeman

Martin Luther King had a dream that still echoes in the conscience of America. I have a plan that will, I hope, reverberate as insistently in our minds. It concerns feeding—reasonably—the people of the world, poor and affluent alike.

The Problem

We know what the problem is: *In the short term,* it is the threat of famine on a sickening scale. Despite earlier optimism about the 1974 harvest in all the

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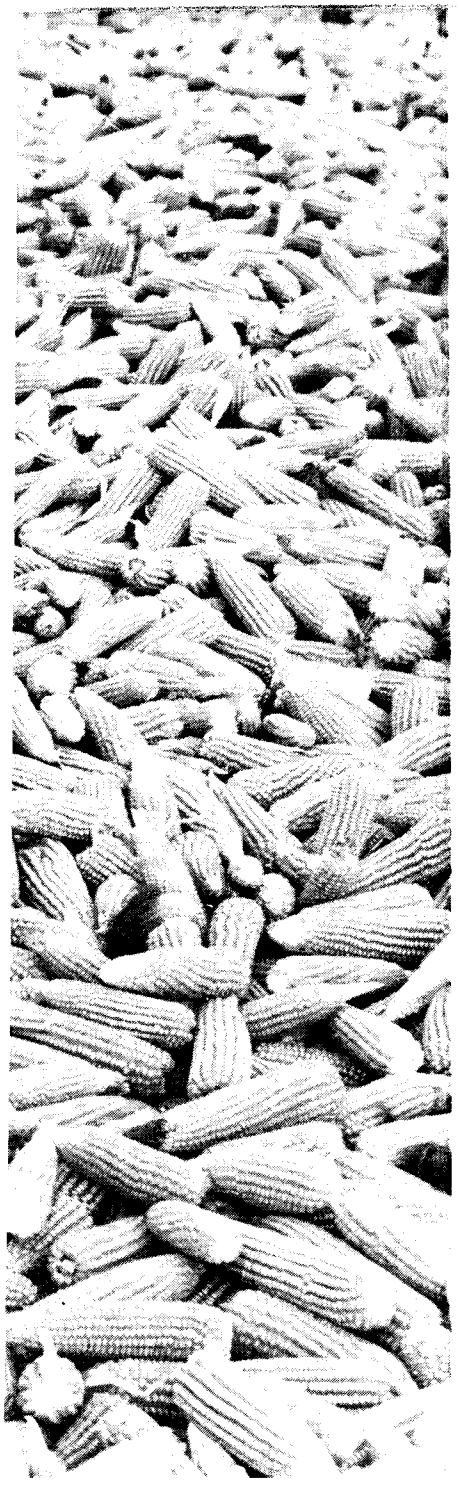

major food-producing countries, it is now clear that as a result of bad weather and shortages of energy and fertilizer, global grain production will fall, in real terms, by about 3 percent. Statistics sometimes obscure reality; so let me state this figure in terms of people. In the year 1973–74, 70 million people were added to the population of the world. There will be 3 percent less of the basic staples they need to survive.

The food-rich countries cannot reopen the storehouses that saw the world through a comparable problem in the Sixties; the larders, even of the wealthy lands, are almost empty. In the early Sixties global grain reserves totaled more than a three months' supply. Now there is less than one month's. And the idle cropland of the United States, which used to be the world's ultimate arsenal in the fight against hunger, is no longer available. The United States has no more fallow acres.

The diminishing harvest and the dwindling global reserves are producing two grim results: They have sent prices soaring, further fueling the two-digit inflation that is already plaguing just about every country in the world; and they are literally killing the world's poor. For the several hundred million people who must spend 80 percent of their income on food, a doubling in the price of wheat and rice cannot be offset in any way. Instead, their subsistence diet is driven below the survival level, resulting at best in serious malnutrition—with its inherent, long-term dangers—and, increasingly, in death. There is evidence that the long-term historical trend toward lower death rates among the world's poor has been reversed. In South Asia and in parts of Africa and Latin America, food shortages and high food prices are taking a growing toll of human life.

OVER THE LONG TERM, we face the specter of the Malthusian equation compounded by affluence. At the global level population growth is still the dominant source of expanding demand for food. With the world population growing at nearly 2 percent per year, merely maintaining current—often desperately inadequate—consumption will require a doubling of food production in little more than one generation. But this is only part of the picture. The fact is that rising affluence creates food demands that increase in geometric, not arithmetic, progression. Affluence creates demand for animal proteins, particularly beef, which multiplies the need for basic grains. To put it one way: In the United States and Canada, per capita grain use is now close to one ton per year. Of this, only about 200 pounds are consumed in the form of bread, pastries, or breakfast cereals. The rest becomes raw material for the production of meat, milk, and eggs. As a result, the agricultural resources—land, water, fertilizer—required to support one North American are nearly five times those to support one Indian, Nigerian, or Colombian. And the unmistakable trend is for more people everywhere to try to achieve the North American level and style of nourishment.

Fundamental Solutions

We have begun to face some of the fundamental answers to these basic questions of human survival. In essence these are the control of waste by the affluent and the control of population by all. The affluent must learn to simplify their diet by reducing their consumption of livestock and livestock products, and by substituting vegetable proteins for some of their animal proteins. There are four good reasons for doing this. The most personally compelling is the fact that medical authorities are increasingly discovering that too much consumption of animal products and proteins is dangerous to health. (Evidence already indicates that excessive meat-eating increases the likelihood of both heart disease and cancer.) An additional argument—increasingly convincing to many people even in the affluent societies—is that meat is more expensive than other, equally nutritious, forms of food. Also, the production of animal proteins is more demanding on the ecology of our planet than are simpler diets. And finally, there is the moral imperative at this stage of human evolution, which demands that the affluent stop literally taking food out of the mouths of the poor. In a world of scarcity—the world we now have and will have for some time to come—the arithmetic of consumption is frightfully simple. If some of us consume more, others must of necessity consume less. Inevitably those who consume less are the world's poor, who have no remaining notches left with which to tighten their belts.

What the world's poor must learn, along with the rich—and the rich must help to make it possible—is that there is no security in a large family. It is quite clear that the world cannot continue on its present demographic path. Future population growth will be reduced either because of rising death rates (a phenomenon appearing already in some developing countries) or because of declining birth rates. The choice is finally very simple: It is between famine and family planning.

Whatever kind of dust nationalistic

Orville Freeman was Secretary of Agriculture from 1961 until 1969. Author of World Without Hunger, *he is now chief executive officer of Business International Corporation in New York City.*

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A New Earful

For the malnourished tens of millions in Latin America, Asia, and Africa whose principal source of vital protein is corn—the world's third major food after rice and wheat—recent research holds out the possibility of both a better diet and more food. In Mexico, at the International Center for the Improvement of Maize and Wheat (acronymed CIMMYT from its name in Spanish), plant breeders are advancing on two fronts: They are adapting the genetic endowment of the ordinary corn plant, a temperate-zone species, to the tropical agriculture of the world's hunger belt; and they are radically altering the protein balance of the corn kernel so that it will be more nutritious for humans.

Too much of the protein in the ordinary corn kernel is locked up in a fraction, zein, which is indigestible by single-stomached creatures. At the same time the protein is deficient in lysine and tryptophan, which the human body cannot synthesize and must get from food. In 1963 Purdue researchers discovered an oddball group of mutant corns with a recessive gene linked to less zein and more lysine and tryptophan. Tests by a Rockefeller Foundation team in Colombia four years later demonstrated that the mutant corn—called "opaque-2" because of its chalk-white kernel—could actually reverse the ravages of protein starvation in moribund children. The opaque corn was as protein-rich as skimmed milk. Under a special grant from the U.N. Development Program, the high-lysine strain was sent to CIMMYT to be crossed with high-yielding varieties adapted to varying agronomic and consumer demands around the world.

Meanwhile, CIMMYT's plant breeders have been working overtime to improve ordinary *Zea mays*. Crossing thousands of strains through seven generations, they have produced varieties that grow three feet shorter and flower a week earlier than unimproved plants, thus diverting growing time and photosynthetic energy from the production of useless greenery to the manufacture of food kernels. The new plant is sturdier, increasingly resistant to pests and diseases, and responsive to a broad range of growing conditions. Finally, to this improved corn plant, the CIMMYT breeders are adding the opaque-2 gene. On May 10, 1972, CIMMYT harvested the world's first four bushels of improved tropical corn with balanced protein. The new seed is now undergoing the necessary international field trials before it can be offered to government agencies around the world for release to individual farmers.

ANTHONY WOLFF

pride and prejudice still throws in people's eyes, the real need for all is for a worldwide effort, stepped up sharply and immediately, to stabilize the world's population. What we need is zero growth everywhere—and as soon as possible.

TO ACHIEVE THIS GOAL, a four-part package is required. It consists of: (1) family-planning services made available to everyone; (2) meeting the basic economic and social needs of the poor so that they lose the motivation that drives them to create large families; (3) new roles for women that make it possible for half of the world's population to achieve social status and self-fulfillment through activities other than bearing and rearing offspring; (4) devising national economic and social policies that encourage and promote low fertility instead of propagating population explosions, which spell tragedy for the family, insurmountable problems for the nation, and disaster for the world. That all of this can be done has already been demonstrated by societies as different in size, economic policy, and political principle as Singapore on one side of the spectrum and the People's Republic of China on the other.

However, even if we start a plan for action now to control waste and population, it will take decades before these fundamental efforts achieve the required results. Meanwhile the world must be fed. I have a plan that could do it.

A Plan for Action Now

The plan calls for a global effort with three ingredients: resources, know-how, policies.

In the area of resources the world still has vast stretches of land that have never been put to the plow but could be, and yields on currently producing acres in the developing countries could be doubled and tripled if modern techniques were used. I have, for example, recently returned from Zambia. There I was shown land, about as large as Texas, that has never been cultivated. I do not know exactly what the water problems are. But in one enormous experimental farm, it was demonstrated convincingly that if there is a water problem, it can be solved. How many other millions of acres exist in Africa that have never been used?

In Asia, on the Indian subcontinent, the Ganges delta alone is as large, and could be made as fertile, as the entire Midwest cornbelt of the United States. In Brazil, and in tropical countries around the globe, the right inputs would make possible double and even triple cropping where now there is either nothing or at best stick agriculture.

What is true for food is true also for

A Sorghum With Snap, Crackle, and Pop

The diet in some developing nations may well be aided by a new type of sorghum, rich in protein, that has recently been developed by scientists working at Purdue University.

Only wheat, corn, and rice are reaped in greater quantity than sorghum, which is the fourth largest cereal grain grown by farmers around the world. A tenth of the world's population count on the cereal as the principal staple of their diets.

In the Purdue experiments the new strain was chemically produced in a laboratory, and then tested on baby rats. The weight of the rats fed the new sorghum increased three times as fast as that of the rats given regular sorghum.

Protein-rich strains of sorghum were found to be growing wild in Ethiopia by other Purdue scientists last year, but the yield of those finds was found to be inadequate. The new Purdue discovery offers heavier yield as well as high protein and can be grown successfully in temperate climates, although it is not suitable to the tropics.

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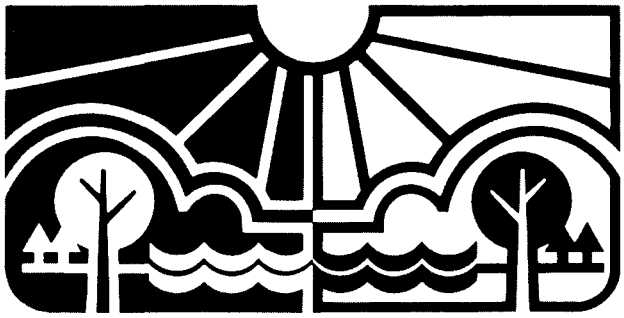
Needed: a nationwide power grid

Our country, once a land of isolated communities, is bound together today by networks of many kinds—highway, railroad, television, telephone, radio.

Missing, however, is one highly important network . . . a system for sending electricity to where it's needed, when it's needed . . . shuttling millions of kilowatts from sleeping California to up-and-about New York, for instance, and back again when required.



We of America's consumer-owned rural electric systems believe a nationwide power grid—an extra high voltage system—capable of quickly moving large blocks of power anywhere in the country—north, south, east or west—is long overdue.

It becomes clearer each day that if we, as a nation, are to solve our complex and persistent energy problems, we must take this and other steps—using to the fullest extent technical capabilities now available—that will help maximize the efficient use of our power generating facilities and energy supply.

We believe such a grid system can best be achieved within the present pluralistic ownership structure of the electric industry. But size of profit or feasibility of investment should not be the all-determining factors. *Performance in the public interest*—that must be the principal purpose and value. This means every element of the electric utility industry—and government—must carry its fair share of the financial responsibility.

To enable our nation to use energy resources more wisely . . . to help match supply with demand and reach the primary objective of ensuring reliable electric service for all Americans . . . and for national security and consumer health, safety and convenience, we advocate speedy development of a nationwide power grid.

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fertilizer. The developing world is replete with natural gas that goes unused. In some places it has never been tapped. In others, such as the Middle East, it is being wasted—flared off at oil wellheads. With the right technology, it could be converted into inexpensive fertilizer, which the countries that need it most can afford.

In the past there was no need, and therefore no incentive, to use these idle resources of either land or gas. It was easier, and often made more economic sense, to import both food and fertilizer. But this is no longer true. The need, and the price structure, is such that many productive efforts that were marginal before are vital and viable now.

IT TAKES KNOW-HOW. And the know-how is available. What needs to be designed is a system that will bring together the land, the know-how, and the capital required for creating a productive enterprise. I think I can suggest a system that would work and would serve two additional purposes important to the economic health and social welfare of the world, that is, the creation of jobs in the developing countries that are plagued by unemployment and underemployment, and the introduction into the market economy of segments of the population that now struggle along on a bare subsistence level.

My system starts with the fact that the change in oil prices has brought about an enormous concentration of capital that cannot be put to use in the countries accumulating it. They must put it somewhere and are under increasing pressure from the whole world, and particularly from the "superpoor"—the developing countries that have no quickly marketable natural resources—to use at least some of it to help people now threatened by famine as the direct result of the dizzying cost-climb of oil and all the products derived from it.

The second component of the system is the array of major international agribusiness firms that have the experience, the technology, and the management know-how to put to use some of the vast acreage that now lies idle or is cultivated in inefficient, outmoded ways. In establishing productive, large-scale farming ventures, these companies could provide supervisory and technical services to hundreds of nearby small farmers, who could become contract suppliers. Satellite farming systems of this type are already quite widespread in such agricultural sectors as sugar, vegetables, poultry, and a range of exotic products including bananas and cashew nuts. Utilized in this manner, the capital for the required inputs—fertilizer, chemicals, and seed; the know-how and organizational skill for applying modern agricultural technology effectively; and the processing and marketing ability that can get the food where it is needed and at the same time provide a decent living standard for the producer—can all be brought together.

IF THIS SYSTEM has the ring of a "do-gooder" scheme, the ring is one of pure gold. The fact is that well-run agribusiness projects in some developing countries have returned as much as 30 percent a year on investment. Oil-producer money looking for a home can hardly do better. And aggressive, imaginative international companies always respond to an opportunity that makes profitable use of their abilities.

What the system requires as a third input—and that, I suspect, will turn out to be the most problematic component—is sensible, constructive policies from the political leaders of the developing countries. Such policies are hard to come by. Agriculture is complex and expensive, and demonstrable results with a clear political payoff take time to achieve. Effective political pressure to build up agriculture is the exception, rather than the rule, in the developing world. Where it does exist, it tends to come from an entrenched, feudal, land-owning elite, which is, in today's world, more of a political liability than an asset. Small farmers are seldom, if ever, organized. The temptation to pay lip service to agriculture instead of moving to action—particularly to the complicated and sometimes politically hazardous action of getting modern agricultural technology adjusted to a labor-intensive basis reaching the small producer—is very great. But action is clearly needed and, I believe, unavoidable. If the right policies are pursued, I am convinced that the capital and technology will be forthcoming.

The Institutional Framework

While this tripartite system is put into place on the production side, parallel work must be done on building the institutions that will support and sustain the productive effort over the long pull.

In constructing these institutions, the most immediate task is to shore up the crumbling roof that threatens to crash

Green Horizons

More than a decade after the high-yielding "miracle rice" of the Green Revolution deferred famine in Asia, the debut of a second generation of improved rice varieties is encouraging agricultural experts to hope for an even greater surge in food production. Rice is the main food of a full third of humankind; so the hoped-for explosion in rice yields could prove the salvation of well over a billion people.

The scientists' high hopes rest on new "miracle" strains of rice that are being developed mainly at the International Rice Research Institute (IRRI) in the Philippines, which developed the original high-yielding strains in the early Sixties, and at the All-India Coordinated Rice Improvement Project in Hyderabad, India. In recent tests on Taiwan, strains developed at these institutes yielded 3,500 pounds of rice per acre; India's rice growers currently average perhaps 1,000 pounds per acre. Some farmers in the Philippines are now routinely growing two crops of "miracle rice" per year, in non-irrigated paddies.

Finally, the hopes of Green Revolution optimists continue to be buoyed by the success—notably in India—of dwarf wheat strains originally developed with Rockefeller Foundation support at the International Center for the Improvement of Maize and Wheat, in Mexico. With the aid of these strains, India's wheat output soared from 11 million to 26 million tons between 1965 and 1972.

These heartening developments, together with the success of new weed-killing agents, have persuaded some agronomists that the "second-generation" Green Revolution crops can keep pace with the burgeoning of population expected in the decades just ahead.

Other observers, mindful of earlier Green Revolution miscues, fear that the new strains will fail because of shortages of irrigation water and fertilizer and depleted soil. But agricultural experts agree that immediate widespread exploitation of the new strains offers Asia its best hope for the year 2000, when the world's rice-dependent population will have exploded to double what it is today.

HALLOWELL BOWSER

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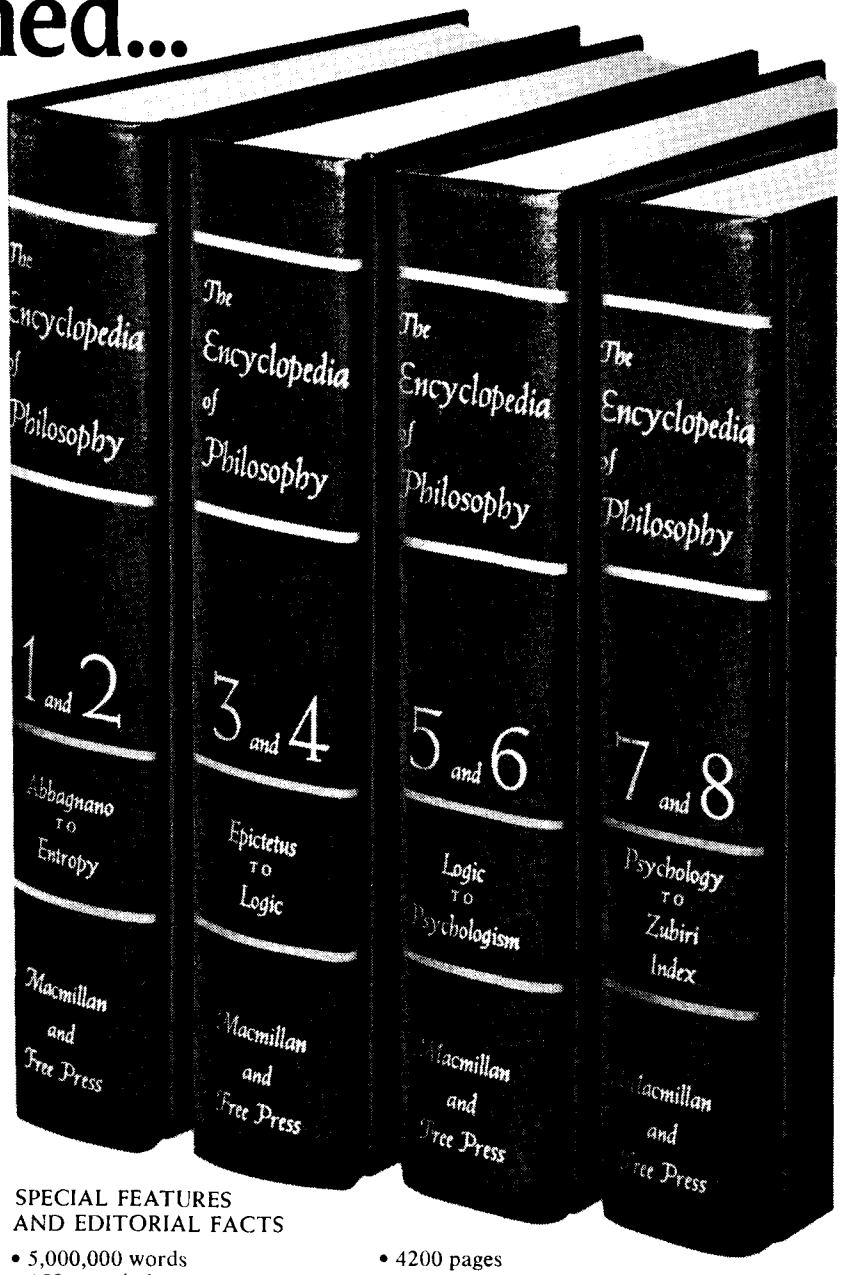

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down on a segment of mankind. *A global commitment is necessary for preventing large-scale famine in 1975.* The industrialized countries and those of the oil- and cash-rich O.P.E.C. (Organization of Petroleum-Exporting Countries) must make the major contributions to this effort, but all the more fortunate countries of the world that have been spared harvest failures should play their part.

HOWEVER such a program of relief is financed, it is clear that the biggest share of the needed grains must come from the North American continent, although both the U.S.S.R. and Europe seem to have some reserves that can be tapped for this emergency. In this food-short world, there will inevitably be upward pressure on prices, and that will work a hardship on consumers in the producing countries as well as on the countries needing the grain. We thus face a great, immediate challenge in institution-building, and as in most institutions, this fundamental challenge is a moral one. It is simply whether the more fortunate world is going to feed other nations, even at the expense of higher food costs at home, or turn its back on the hungry of the world.

Once this shoring up has been accomplished, the walls of the institutional edifice must be strengthened. This means that *we must move toward the orderly marketing of agricultural products on a worldwide basis,* starting with an ongoing exchange of information and the planning of reserve management. This would avoid go-it-alone moves, such as the U.S.S.R.'s secret manipulation of the wheat market in 1972 or the United States' sudden export embargo on soya in 1973, both of which sent shock waves through the entire world, with economic and political reverberations that are still being felt.

Finally, *the world must design commodity arrangements that work.* It could be done quite simply. A bipartisan bill is now before the U.S. Senate (S. 2005), which could serve as a pattern. The main requirement is to create an international body that would set minimum and maximum prices for each basic agricultural commodity. If prices drop below the established minimum because of an exceptionally good crop year, governments could buy the staple in question and use it to build reserves. Such reserves would be completely insulated from the market, unless and until prices soared to the established maximum level—as they did in 1973–74, when a production shortfall of 3 percent resulted in a price hike of 250 percent. With such parameters of safety and sanity established, the free world market could function as it does now to fix prices and allocate resources.

I am aware, of course, that commodity arrangements have been tried in the past and, for one reason or another, could not be made to work. It is my contention that people who were not ready to participate in such arrangements in the past are ready, or at least are getting ready, to do so now.

I see a number of signposts pointing in that direction. At the World Food Conference held under U.N. auspices this year, the Socialist countries of Eastern Europe are participating for the first time. In Western Europe, the E.E.C. countries have signaled that they would be prepared to open their market and remove the protective devices of their common agricultural policy if international agreements are reached that offer price protection to producers. Such an opening of markets would act as a strong stimulant to agricultural production all over the world. I even see a signpost in the conference on the law of the sea that took place in Venezuela earlier this year. True, it produced no immediate concrete results. But it did reflect a universal recognition that the go-it-alone attitudes and habits of the past are no longer viable and that something must be done to build a global system which will serve all.

IN MY JUDGMENT, nothing novel or radical is needed in the way of institutions that could serve the interim purpose. A strengthened, widened G.A.T.T. (General Agreement on Tariffs and Trade) would suffice. G.A.T.T.'s concern in the past (and it has done well by that concern) has been to assure equitable access to markets. This concern should now be widened to include equitable access to supplies. The United States has provided the leadership that moved the nations of the developed world—the old rich—toward progressively opening their markets. Similar leadership should now persuade the countries with the vital raw materials—the new rich—to move in the same direction in offering fair and equitable access to supplies.

Of all supplies, food is the most fundamental. It is my belief that if the world can get together to find a solution to the problem of food, solutions to other supply problems will follow. And it is my conviction that the answer to the problems of interdependence is not a scurrying for cover behind national barriers, but more interdependence, the construction of institutions and relationships that build on sense and sensibility by all, for all.

Where food is concerned, we know only too well what the problems are. They are staring us in the face. Let us not dissect them to distraction or despair at their magnitude. Solutions exist. My plan is one. Let us move to apply them. □

"A couple of weeks on the beach helps me cope."

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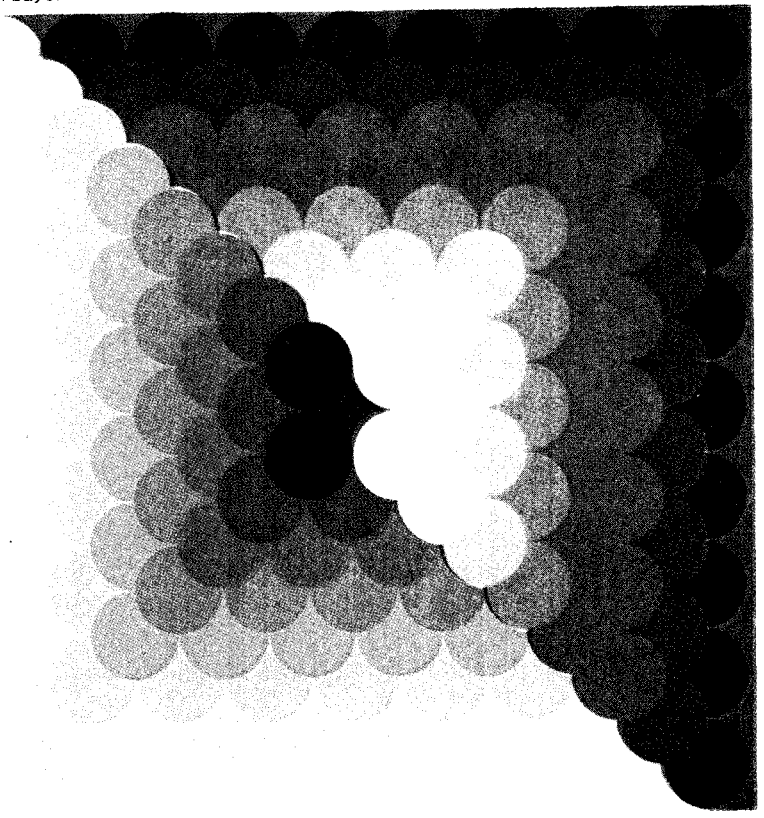

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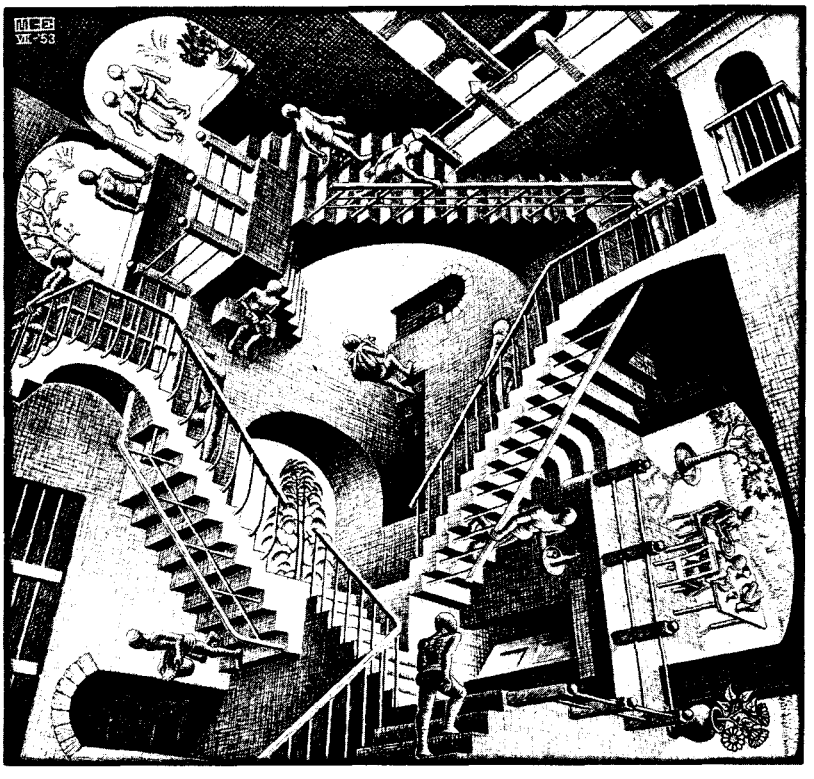

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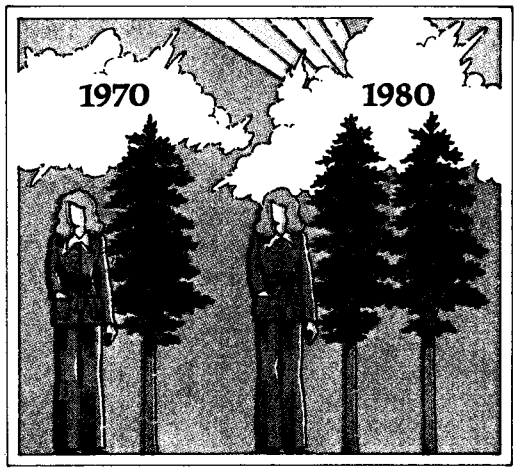

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Out of the Dark Forest of Depression

Two eminent financial experts set forth their own proposals for leading afflicted nations, rich and poor, out of want, starvation, and inflation.

(1) Greening the Landscape

by Robert McNamara

In the past 12 months, the world economic scene has grown increasingly turbulent. The series of changes that have occurred have been of a magnitude previously associated only with major wars and depressions. New problems have arisen, older problems have become more acute, and the cumulative impact of events has touched every nation on earth. Though all of us have been affected in varying degrees by these complex events, by far the most adverse effects have fallen on those countries least able to cope with them: the poorest developing nations.

The real issue, then, is whether we fully understand what is happening to the poorest countries—and having understood the problem—whether we are ready to do what is necessary to assist them.

Among the 2 billion people living in the more than 100 developing countries that the World Bank serves, there are hundreds of millions of individuals barely surviving on the margin of life, living under conditions so degraded by disease, illiteracy, malnutrition, and squalor as to be denied the basic human necessities. These are the "marginal men," men and women living in "absolute poverty," trapped in a condition of life so limited as to prevent realization of the potential of the genes with which they are born, a condition of life so degrading as to insult human dignity—and yet a condition of life so common as to be the lot of 40 percent, some 800 million, of the peoples of the developing countries.

Last year in Nairobi I outlined a program for the Bank that would begin to deal with these issues. That program will put primary emphasis, not on the redistribution of income and wealth—as justified as that may be in many of our member countries—but rather on increasing the productivity of the poor, thereby providing for a more equitable sharing of the benefits of growth. With 70 percent of the population in the developing countries living in the rural areas, the center of the problem is there.

I have pointed out that a reasonable overall productivity improvement objective would be to increase production on the 100 million small farms, with areas of less than five hectares, so that by 1985

Robert McNamara, former president of the Ford Motor Company and Secretary of Defense in the Kennedy and Johnson administrations, is president of the World Bank.

(2) Living in a Wizardless World

by David Rockefeller

A few weeks ago I had the pleasure of speaking as part of a program that included that wonderful performer Ray Bolger. His presence naturally brought to mind the motion picture *The Wizard of Oz*.

If memory serves me correctly, Ray played a scarecrow that went on an extended journey to the land of Oz in the hope that the wizard, a man supposedly endowed with magical powers, would give him the brains he long desired. Even though he and his companions went down a yellow-brick road and wandered over the rainbow, the wizard they sought eventually turned out to be a fraud. Instead of supplying the scarecrow with brains, he could only give him, as a kind of consolation prize, a diploma.

We may now be more sophisticated than our friend the scarecrow, but the search for some kind of wizard who will answer our prayers and fulfill our needs still persists. Many people continue to believe that somewhere at the end of the rainbow lie magical solutions to the grave problems confronting us today. But unfortunately for us, the only true hope for solutions lies in simple, time-tested virtues—the intelligence and the will that are required for meaningful progress.

Although we have recently been taking strides away from complacency, we may still be too close to catastrophe. The economic summit meetings of a few months ago and other international conferences have done a great service in focusing public attention on crucial economic issues, but we still have a very long and arduous road ahead of us.

If nothing else, the shock waves generated by last year's oil embargo, which destroyed our comforting vision of unlimited resources, may have had the salutary effect of accelerating the search for long-range solutions. I am hopeful that out of our recent crises can come the universal acknowledgment that, domestically and internationally, economic interdependence is an existing fact of life. But solutions demand action and programs as well as awareness, and time is clearly of the essence.

I would like to address myself to a few of the domestic and international aspects of our major economic dilemmas—suggesting some possible areas for constructive action. Obviously, the energy situation is closely related to all of what I have to say.

Domestically, it is no secret that inflation remains our greatest single challenge. I would like to suggest seven areas

David Rockefeller is chairman of the board and chief executive officer of the Chase Manhattan Bank.

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McNamara:

their output would be growing by 5 percent per year, a rate more than double that of the Sixties. It is clearly an ambitious goal, but one whose achievement is made more urgent by the continuing food shortage in the developing world.

The Bank is determined to pursue this goal. But I should stress that what the Bank does is much less important than what governments do to deal with these issues.

Progress will be possible only if the countries themselves are willing to make strong commitments to pursue agricultural strategies directed toward the promotion of new income and employment opportunities for the poorest groups. They must commit themselves to effective land reform, assurance of adequate credit at reasonable cost, and reassessment of pricing, taxation, and subsidy policies that discriminate against the rural areas. We are prepared to work closely with governments that wish to take such actions.

Already we see evidence that the objective of a 5-percent-per-annum increase in production can be realized. In the past year we assisted in financing 51 rural-development projects in 42 countries, involving a total investment of almost $2 billion. These projects are expected to have a direct benefit for at least 12 million individuals and should generate increases in production of more than 5 percent per annum for the beneficiaries, whose present incomes average less than $75 per capita.

During the next five years, our lending to agriculture should double, supporting projects whose total costs will approximate $15 billion and whose direct benefits should extend to 100 million rural poor.

We expect the economic returns on these investments to exceed 15 percent. They would be similar to the following six projects, which the Bank approved this summer:

- A $10.7 million credit for agricultural development in the southern region of Sudan, which will provide a higher standard of nutrition for some 50,000 farm families through expanded food crops, will assist an additional 13,000 farm families through new cash crops, and will benefit roughly half the region's total population of 3 million people through improved, disease-free livestock.
- An $8 million credit for a comprehensive rural-development project in Upper Volta, covering extension services, small-farmer credit, improved water resources, and greater access to health facilities—a project calculated, in all, to benefit some 360,000 individuals, 7 percent of the country's total population in over 10 percent of the country's cultivated land area.
- A $21.5 million credit for a broadly based livestock-development program in Kenya, including provisions designed to assist traditional nomadic herders, to improve 10 million acres of communal rangeland, and to expand wildlife areas in order to lessen the conflict for food and water between wildlife and cattle. The program will enhance the incomes of 140,000 rural inhabitants.
- An $8 million credit for an in-

(Continued on page 28.)

Rockefeller:

in which I believe action is of critical importance in dealing with inflation.

First, we must strive for progress on the fiscal side by curbing government expenditures at all levels—federal, state, and local. Cutting back is no easy task. While everyone endorses less government spending in principle, it is a rare person who wants cuts that may affect him. But if we are to make significant headway in fiscal restraint, nothing can be sacred, including the many areas of the budget that have built-in escalators. At the federal level the proposal to limit spending to $300 billion strikes me as very sound, and similar unpleasant but essential approaches are needed at state and local levels as well. Congress and other legislative bodies may not act unless they feel public pressure to do so.

It should be emphasized that while I see the need for a greater measure of fiscal responsibility, I am equally aware of the importance of not halting or setting back economic and social gains by minority groups and the disadvantaged. Obviously, it is they who suffer the most from the pressures of inflation. Even as we move toward reduced budgets, we must set aside whatever funds are required to compensate those whose plight might be most seriously aggravated by measures to cure inflation. The taxes proposed in President Ford's program were for this purpose, and I cannot disagree that they or something like them will be needed.

Our fiscal policy must be coordinated with a sound monetary policy, the *second* key area. Because of a reluctance to implement fiscal measures, it has been monetary policy that up until recently has been carrying the major burden of the fight against inflation. The consequence has been soaring interest rates and severe disruptions in housing construction and public utilities.

Fortunately, signs are now evident that the Federal Reserve has reduced its pressure on credit expansion, thereby permitting interest rates to move down somewhat. I would hope that such relaxation would continue, allowing rates to move downward still further. In this connection, I was also pleased that President Ford called for special measures designed to release urgently needed funds for the housing industry, for the ills of that industry are great indeed.

A *third* critical area involves the question of the environment and the economic and social trade-offs necessary for permitting economic growth while at the same time curbing environmental pollution. Although I would not suggest for one moment that we renege on our commitment to achieving high environmental standards, I do believe we ought to re-evaluate the degree and the timing of the standards we have adopted. We must assure ourselves that the results of our anti-pollution and similar programs fully justify the higher prices they necessarily bring and the encumbrance on capital available for *productive* investments that they cause. Again, an economically sound environmental policy will demand greater public awareness and discussion of the options available if we are to achieve increased willingness to cooperate and compromise where necessary.

A *fourth* and closely related issue concerns the adequacy of our supplies of energy, food, and raw materials. Last winter's oil embargo dramatized quite graphically the fact that our domestic

(Continued on page 28.)

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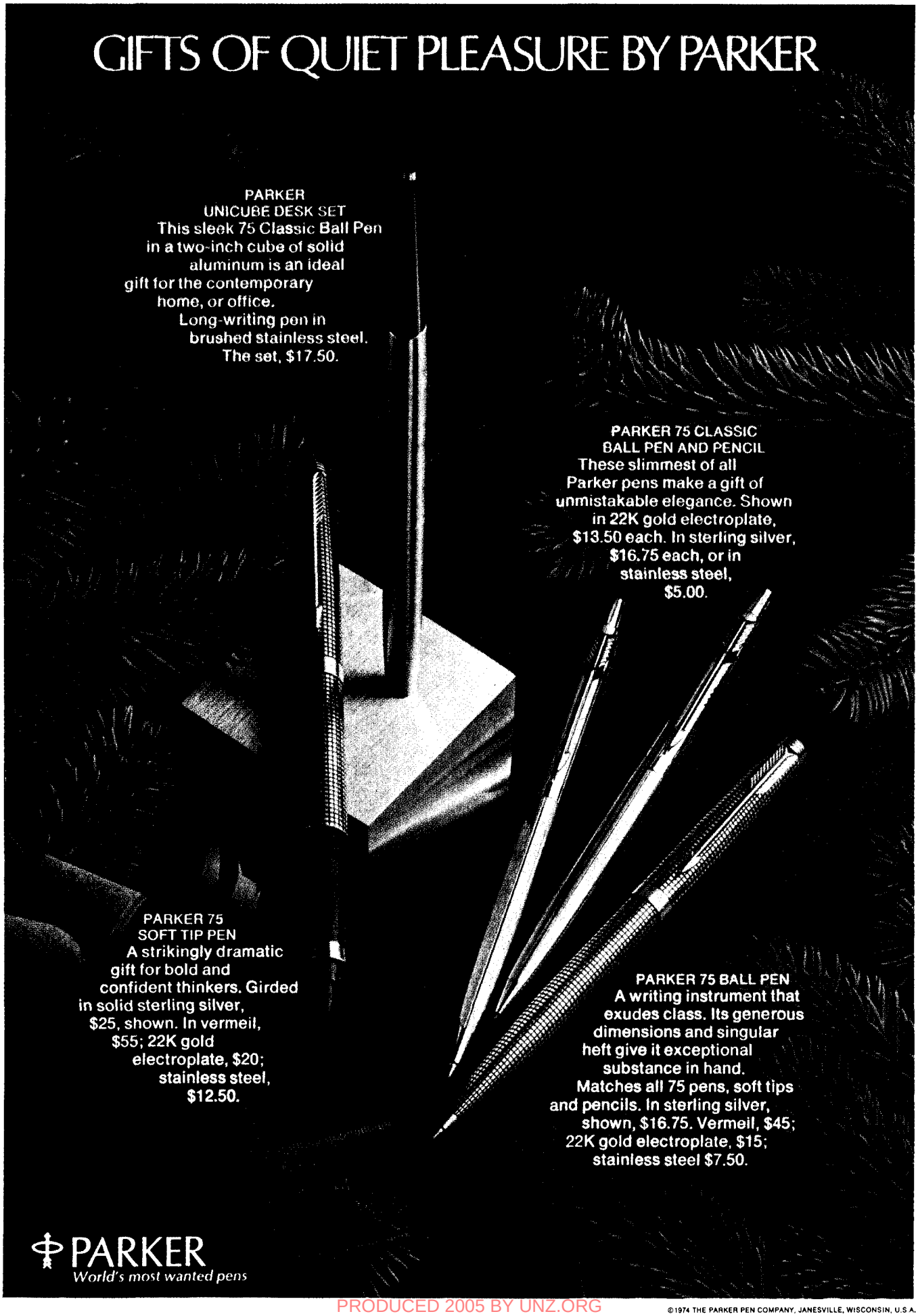

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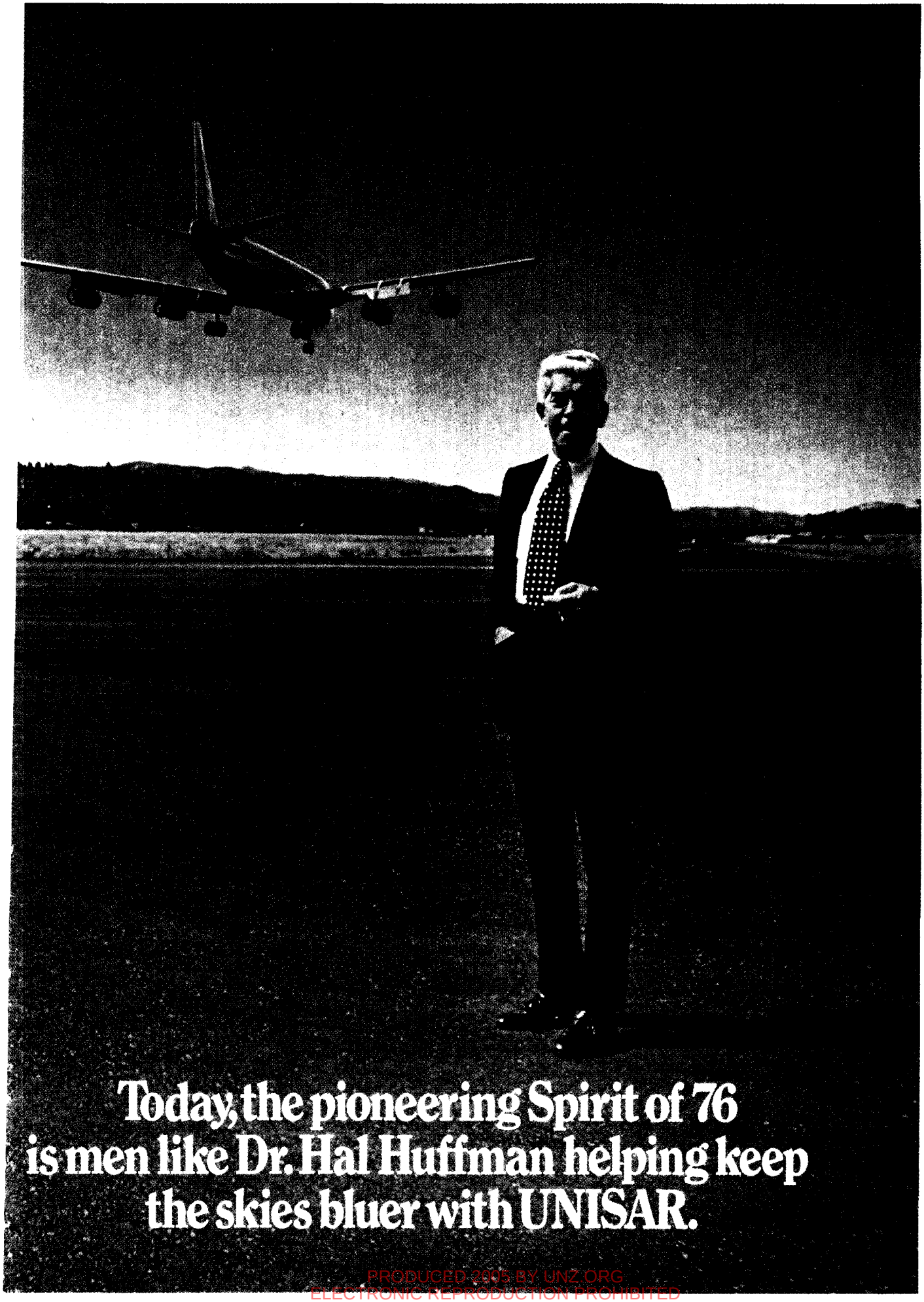

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McNamara *(from page 24):*

tegrated rural-development project in Mali, providing farm inputs and equipment, an expanded functional literacy program, improved medical and veterinary facilities, and an agricultural-research program. The program will reach over 100,000 farm families—some 1 million individuals—with agricultural services that are projected to triple their per capita incomes.

• A $30 million credit for a comprehensive dairy-development project in India, providing for an increase in production of a million tons of milk a year, as well as for 100,000 heifers. The project will organize small cattle owners into 1,800 dairy cooperatives, which will directly benefit some 450,000 farm families—2.5 million individuals—the majority of whom own holdings less than two hectares in size or are landless. The economic return of the project is estimated at more than 30 percent on the capital invested.

• A $10 million credit for a rural-development project in one of the poorest regions in Tanzania, enhancing the productivity, incomes, and living standards of some 250,000 people—roughly half the entire rural population of the area—through improvements in agricultural practices and infrastructural investments for 135 newly established villages. The project aims at doubling the per capita incomes of the villagers over a 12-year period.

Many more similar projects are under preparation. For example:

• A project in the three northern states of Nigeria, providing for the construction of 3,500 kilometers of low-cost farm-to-market roads, 250 earth dams, 480 rural water-supply ponds, and new marketing and credit services. It is designed to benefit 226,000 rural families—over 1.5 million people—by raising incomes substantially above their present level of $40 per capita per year.

• A project in one of the poorest regions of northeastern Brazil to raise the productivity of 33,000 farms (which support 200,000 people) by increasing the number of extension agents, establishing demonstration farm plots, and introducing improved credit, marketing, health, and educational facilities.

• A project in India's drought-prone areas, which cover 250,000 square miles and are inhabited by 66 million people. It aims to diversify their production into activities less dependent on rainfall. The project includes minor irrigation works, watershed management, improved crop-production methods, sheep and dairy development, credit facilities (especially to smallholders), applied research, and farmer-training programs. A population of over 1 million will have their incomes increased as a direct result of the project. One hundred thousand man-years of additional employment will be generated.

Perhaps the most comprehensive project we are working on is an effort to assist the government of Mexico in its nationwide program of rural development. The project is designed to reach the lowest income groups and would involve a total investment of $1.2 billion during a four-year period. The program grew out of the government's realization that although the nation had achieved, in the last three decades, the highest sustained growth in agricultural production in Latin America, rural poverty appeared

(Continued on page 35.)

Rockefeller *(from page 24):*

energy supplies are becoming inadequate for meeting our growing demands. Although America is better positioned than most other countries to meet the soaring need for energy and other resources, it can no longer operate on the assumption that such supplies are unlimited or that they will continue to be available at constant cost. Our wasteful policies of the past must end, and we must exercise greater restraint in utilizing such precious commodities. In particular, we must accelerate the development of our domestic resources. We are fortunate in having sufficient land and resources so that we are able to expand supplies substantially, and we certainly have the expertise and the ingenuity to do so. What we need now is conviction and determination together with a program, which our government is in the process of formulating.

Essential in developing such resources is the ability to generate the capital necessary for increasing production, which is my *fifth* point. The main source of strength in our economy at home in recent years has been capital spending. But because interest rates are so high and consumer demand is so uncertain, there are disturbing signs of eroding investment here as well as in other areas. If we are to strike at the very heart of inflation, we must encourage a higher rate of saving and develop more efficient productive capacity, which can be accomplished only if sufficient funds are generated to meet capital needs. In the energy industry alone, for example, our bank has estimated that the capital needs for the period 1970–1985 are about $840 billion. The total financial requirements of the energy sector, in this nation alone, come to the staggering sum of well over $1 trillion.

The investment tax credits proposed as part of the President's economic package will be a helpful measure in stimulating capital formation if they are enacted. Further, reasonable and equitable pricing policies permitting a fair return on investments are critical if we are to encourage a level of production that will meet the requirements of the future. Unless the private sector is able to generate the enormous sums of capital needed, our plight will only worsen.

Closely linked to the need for increased business investment is the requirement for improved productivity—the *sixth* area I would like to mention. Wage gains are swiftly eroded in an inflationary period. If the nation's workers are to gain higher real wages, or even maintain their present position, it is imperative that productivity be increased. This can be done only if both labor and management have the common understanding that an economic system that lags in the efficiency of its productive output will ultimately find itself unable to compete successfully in the world market. All barriers to efficient production, whether governmental or private, need to be eliminated. Many are embedded in our tradition, but they must nonetheless be done away with.

Because of the close interconnection among wages, productivity, and prices, government cannot stand completely aloof from the wage-price problem. While I would be adamantly opposed to a return of mandatory wage-and-price controls, I believe that the new Council on Wage and Price Stability will play a constructive role and that the President and Congress have been wise in creating the council.

My final point regarding our domestic economy has to do with the necessity for

(Continued on page 30.)

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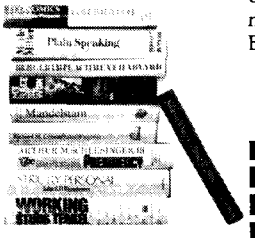

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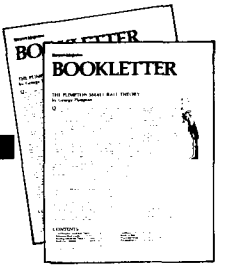

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THE BOOKSERVICE

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Rockefeller *(from page 28):*

conserving those products that may be in short supply. It may be difficult to look beyond the comfortable present to a time when some of our resources will not be so readily available. No one wishes to dwell on the gloomy prospects ahead, but a more farsighted approach is indispensable. The move toward greater self-sufficiency cannot be accomplished overnight, nor can it be done painlessly.

If hopes are realized, a spirit of voluntary cooperation will characterize our efforts in this regard. The cuts in consumption of energy and other commodities requested by the President should not materially disrupt our lives. Yet even small changes in life-styles, if implemented by a responsive citizenry, can contribute significantly to the accomplishment of our goals. To be effective, this implementation will have to be organized in a systematic and sustained manner.

Let me emphasize, however, that our efforts to stimulate production and to reduce, at least in the short term, our consumption of scarce resources should not mean that we are embarking on a policy of economic isolationism. For the steps we take domestically are designed to assist the global economy as well and, in particular, those nations most vulnerable to economic disruption.

WHAT WE MUST DO internationally requires the same kind of broad vision we need on the domestic front. This is no time for a narrow parochial approach to the grave issues confronting us. For what has never before been so apparent is the immediate need for concerted action, on a worldwide basis, to prevent global economic chaos.

Worldwide inflation threatens to destroy the economic and political stability of many nations, industrial as well as underdeveloped—in Europe, in Asia, in Africa, in the Western Hemisphere. How we shall halt the effects of what is also international Public Enemy Number One—while at the same time preventing depression, mass unemployment, and even starvation—is now our highest priority to determine.

The cavalier political use of the world's precious—and finite—resources of food and fuel is a very dangerous game and one that no one will win. For in the long run, all nations and individuals are vulnerable, and while temporary advantages may accrue to some in the near term, they will ultimately be eroded if the global economic system is unable to survive the strains now being placed on it. No nation, or group of nations, can long survive by disregarding the consequences of its actions on others.

International cooperation should focus on two critical areas. First of all, it is vital that oil-producing nations and oil-consuming nations achieve some measure of harmony. Of most immediate concern here is the recycling of oil-surplus revenue to those nations—industrial and undeveloped—that are suffering severe balance-of-payments difficulties, which are crippling their ability to purchase the vital commodities and other products needed for their survival.

The recent fourfold increase in the price of oil not only has made a major contribution to inflation but also has left a legacy of financial turbulence, anxiety, and disruption. All told, this year the oil consumers will run a deficit in their current accounts with the oil producers on the order of $65 billion. By the end of 1976, these accumulated deficits may add up to as much as $200 billion. These are staggering amounts, with serious implications for the stability of international economic order.

It has become abundantly clear that the private banking system, which thus far has borne the brunt in this process, cannot continue to recycle such massive sums of money without seriously eroding its own stability and liquidity. Consequently, the task of ensuring that whole nations do not suffer the ravages of insolvency can be accomplished only through joint action by the nations of the world and the appropriate international institutions capable of meeting this grave responsibility. The oil facility established within the International Monetary Fund was a significant step, but the sums needed far exceed its present capacity. I am hopeful that the I.M.F. Committee of 20 will, by the January 15 deadline they have set for themselves, develop strategies and mechanisms to meet this need, including an enlarged oil facility.

In addition to the necessity for concerted action to recycle oil revenue, there is an equally urgent requirement that the precious oil resources be equitably allocated. It would be tragic if the oil-importing nations should find themselves in heated competition for the supplies needed. A welcome recent step was the agreement entered into by the principal importing nations to create an International Energy Agency. This agency can be of enormous help in mapping out and accomplishing the various projects required.

Common action, on the part of the oil-*consuming* nations in the direction of greater self-sufficiency, is urgently needed. This cooperative effort can take several forms—sharing the existing supplies, reducing consumption, and engaging in large research and development programs regarding alternative energy sources. Such efforts to develop alternative energy sources are also to the long-range benefit of the oil-*producing* countries themselves, who must anticipate that time when their current reserves will be exhausted.

Joint action, then, on the part of *all* nations is absolutely vital if we are to prevent massive economic disarray. The producing and the consuming nations must sacrifice short-range advantages and comforts for longer-term security and stability.

Success in solving our economic problems will demand a widespread public-education program about inflation and how it affects the lives of all citizens. If the general public fails to understand what needs to be done, we will be hampered in our efforts to restore confidence in our system and to maintain its stability.

If sacrifices are needed, the reasons must be carefully explained. If life-styles are to be altered, taxes raised, and consumption reduced, we must make every effort to justify these steps to a public that is too often skeptical of our motives and suspicious of our good faith.

An atmosphere must be created conducive to a recognition of the urgency of the problems, not to a despair of ultimate success. We may face some difficult days ahead in this wizardless world, but with the concerned goodwill of those who recognize that we share a mutual goal, this struggle can indeed be won. □

ANSWER TO MIDDLETON DOUBLE-CROSTIC NO. 62

(JACK S.) MARGOLIS:
(A) CHILD'S GARDEN OF GRASS

One day a tall stranger will come into your village and talk you into trying some, and you will. Grass smokers are the world's greatest proselytizers, and should be out hustling for "The Watchtower." They are relentless.

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JUSTERINI & BROOKS
Founded 1749

Jingle Bells

(Sing it our way. And make your Christmas merrier.)

F Bb F

J & B J & B Rare Scotch all the way

Gm C7 F G7 C7

Oh what fun it is to give J & B Christ-mas Da - ay.

F

J & B J & B

Gm C7 F

Oh how good it is to get

J&B RARE SCOTCH

86 Proof Blended Scotch Whisky © 1974 Paddington Corp., N.Y.

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Energy from

How Exxon is putting America's newest fuel to work for you today.

Energy from the atom is one of our country's most promising sources of power. Today, nuclear power supplies 7% of America's electricity.

Ten years from now, nuclear energy should be generating about one-third of our electrical power. By the year 2000, over half of it will probably be supplied by nuclear energy.

Where uranium is found.

Uranium ore is the raw material for nuclear fuel. So far, the known commercial deposits of uranium that have been found in America are mostly in the western states.

One of the largest deposits discovered in recent years is the site of Exxon's Highland Mine near Casper, Wyoming. Here, we are mining 2,000 tons of uranium ore a day.

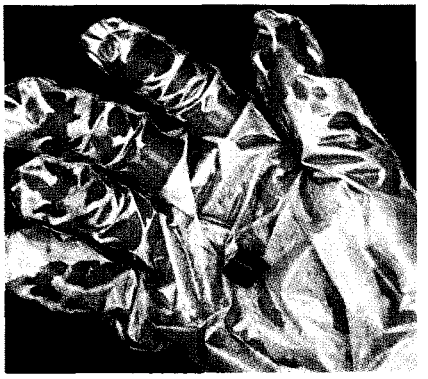
Once the ore is mined, we extract the uranium from the ore and turn it into a fine powder known as "yellow cake."

It is then converted into a gas and sent to plants run by the Atomic Energy Commission. Here, the fissionable, or energy-producing, component is concentrated. This process is called enrichment.

The fuel for a reactor.

We make the enriched uranium into fuel for nuclear reactors at Exxon Nuclear Company's plant in Richland, Washington.

First, we convert it into pellets about twice the size of an aspirin tablet. After numerous checks for precise weight, size, shape and uniformity, the pellets are sealed in zirconium or stainless steel tubes. The tubes are then grouped together in a precise geometric pattern to form a fuel bundle or assembly.

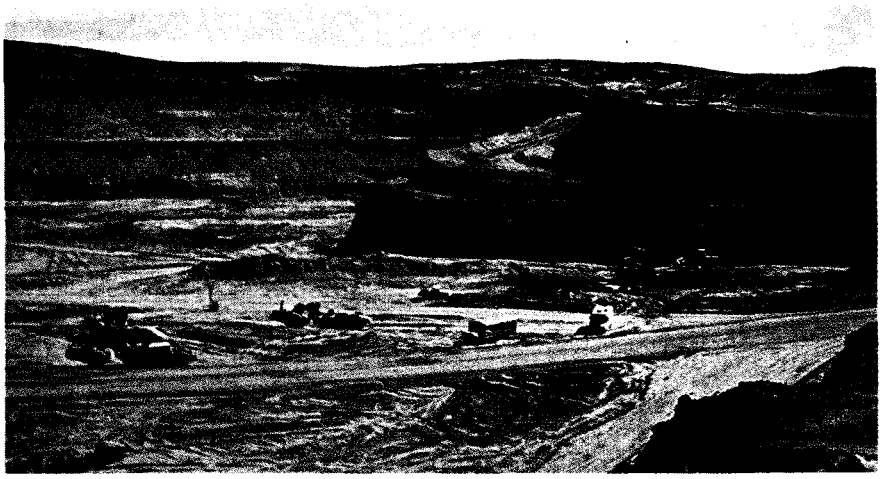


A single tiny pellet of enriched uranium can generate as much energy as 150 gallons of fuel oil. Thousands of these pellets go into a nuclear fuel bundle. A single bundle can generate enough electricity to run 4,000 average-sized homes.

When these assemblies have passed several thousand checks and inspections, they are shipped to nuclear electric-power generating plants. It takes about 600 assemblies to make up the core or heat source of a nuclear reactor. And such a reactor can generate enough electricity to run a city the size of Boston.

Making nuclear power plentiful.

Exxon is currently working on several projects to expand the availa-



This is Exxon's uranium mine in Wyoming. When the surface mining is completed, most of the area will be filled in, contoured and planted to match the rest of the countryside. Grass, wildflowers and shrubs that Exxon planted are already growing on earth that has been excavated.

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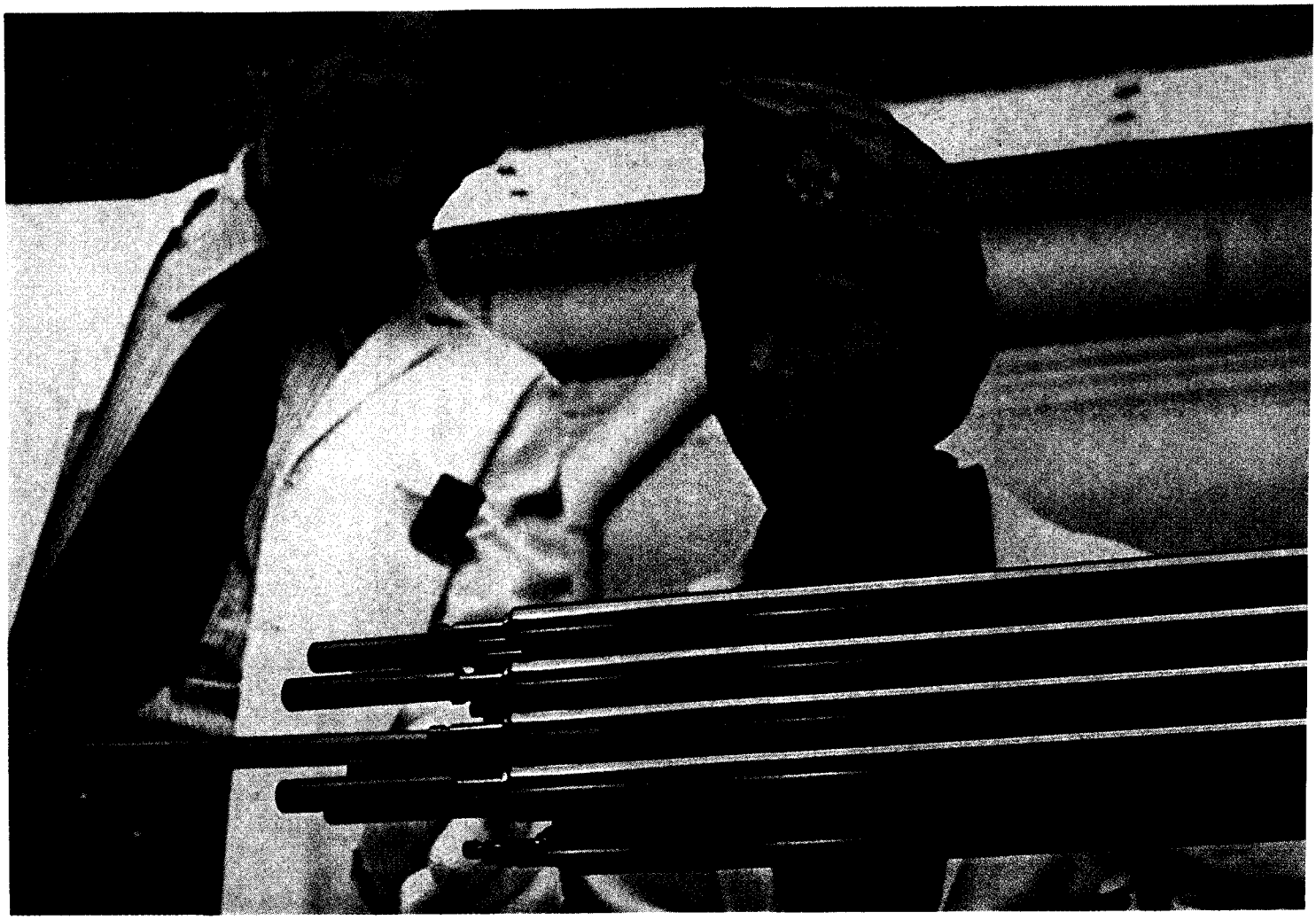
Uranium.



An engineer at Exxon Nuclear Company shows a young visitor how a fuel bundle is assembled. Dozens of zirconium or stainless steel tubes are filled with uranium pellets, then grouped together to form a nuclear fuel bundle. As many as 600 bundles make up the core or heat source of a reactor.

bility of nuclear energy.

One involves the use of plutonium to conserve uranium ore. Plutonium is a by-product of today's commercial nuclear reactor. By substituting plutonium for uranium, the same amount of nuclear fuel can be produced while saving uranium.

In another project, Exxon Nuclear Company is looking into the technology and economics of uranium enrichment.

At the moment all enrichment in the U.S. is done by the Atomic Energy Commission. As the demand for enriched uranium grows, private industry may take on part of this job.

What's delaying nuclear power?

As we pointed out, today only 7% of America's electrical power comes from nuclear plants. The figure is small because the construction of new plants has been delayed. Environmental concerns, labor shortages, technical problems, late deliveries of specialized equipment and changes in regulatory procedures have all taken their toll.

As these matters are resolved, the nation will begin to depend more and more on nuclear energy to produce the electricity to run its factories, heat its homes and cook its meals.

Not an easy job.

Making America more self-sufficient as an energy-producing nation through the use of nuclear power will not be an easy job. But Exxon believes we need to reach this goal as soon as possible.

EXXON

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Observations from space.

"Unconscious of our echoes, we hurl flaming traces of consciousness into the skies."
Alvin Toffler,
Author

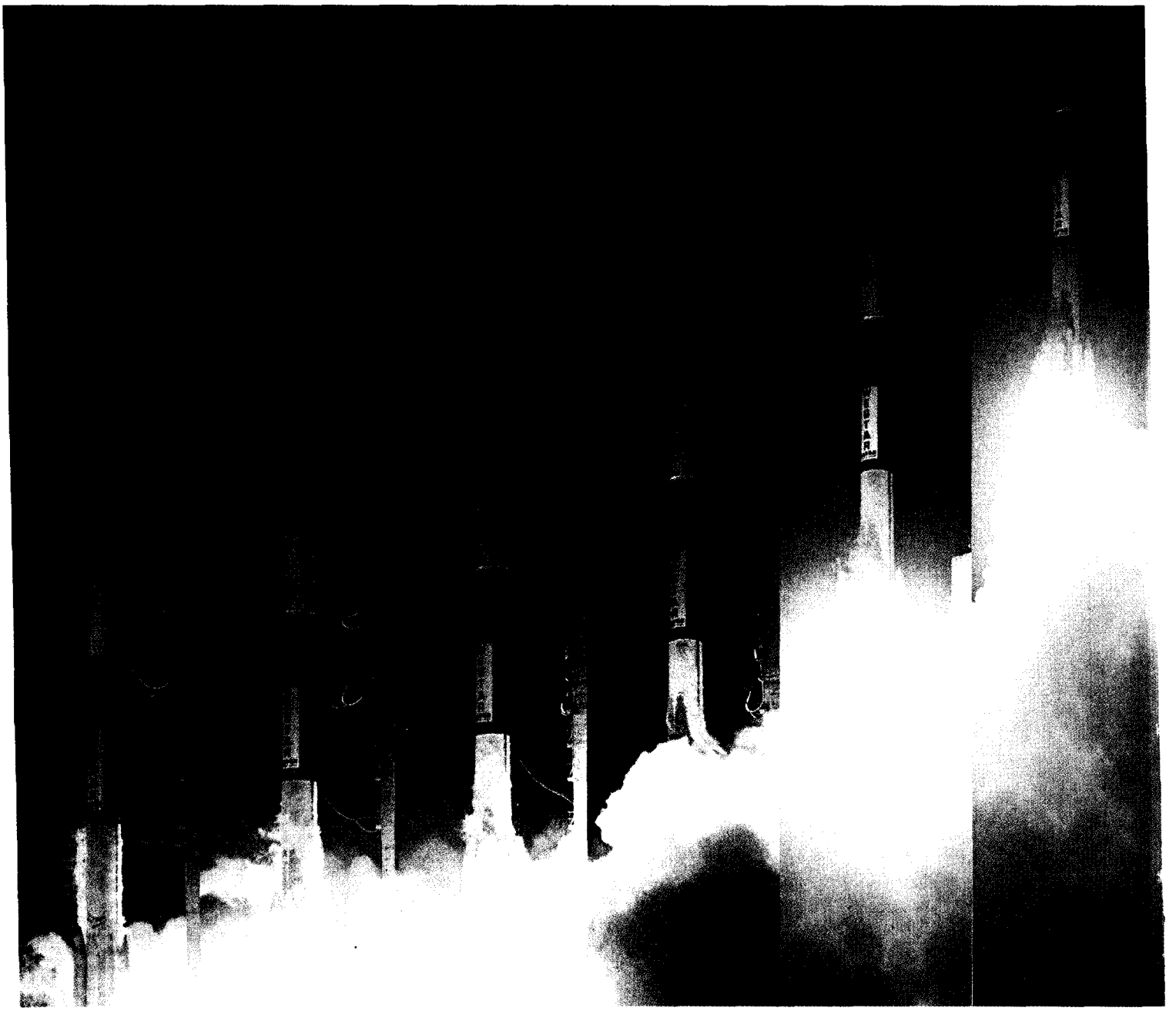
"Better communication is only as good as the speed of the deeds which follow the words."
Tom Bradley,
Mayor of Los Angeles

"By way of space, we return to Earth, which shall be better for the voyage."
Isaac Asimov,
Author

"The glory of humans is that they can do things for the first time."
Norman Cousins,
Editor
Saturday Review/World

"May the quality of our ideas come to match the means for spreading them."
Hedley Donovan,
Editor-in-Chief
Time Inc.

"When the Pony Express linked West to East it was a miracle This is the inheritor."
James A. Michener,
Author



NASA photos of Westar I launch.

On July 15, 1974, Western Union inaugurated the transmission of messages via the nation's first domestic communications satellite, Westar I. To commemorate this historic event, personal observations by several dozen distinguished Americans were transmitted at the speed of light between New York and Los Angeles.

The above quotations were selected from these space age messages for their pertinence to the theme "The Restoration of Confidence." The entire collection now resides in the Smithsonian Institution as an addition to our "Inventory of Hope."

For a copy of all the satellite inaugural messages, write to James H. Foster, Western Union Corporation, 85 McKee Drive, Mahwah, N.J. 07430.

western union

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McNamara *(from page 28):*

to have worsened in many regions throughout the country, especially in semi-arid zones. The economy had been unable to provide the growing rural population with productive employment.

The thrust of the new program is to provide productive investments in low-income rural areas through small-scale irrigation, rain-fed crop production, fruit and vegetable growing, and rural industries. These will be supported by associated investments in labor-intensive feeder-road construction, water and soil conservation projects, and support services for the implementation of the Mexican land-reform program. There will be provision, too, for social infrastructure, such as rural schools, water supply, health facilities, and electrification. This is, in fact, the most complex program with which the Bank has ever been associated.

It is true that the risks of failure are greater in rural-development projects than in some of our more traditional investments. Complicated problems of technology, organization, land tenure, and human motivation remain to be resolved. And yet for the first time, we are beginning to see substantial income and employment benefits within the reach of very large numbers of the rural poor and high economic returns going to the national economy.

What is common to all these efforts within the Bank is an increased emphasis on innovative project design directed toward raising the productivity of the absolute poor and toward helping them become greater participants in their country's progress. It is clear that development efforts of the past, both by governments and by the Bank, have simply not made an adequate contribution to the welfare of this huge and growing group. We must make sure that the unprecedented combination of events that is currently disturbing the world's economy—to which I now want to turn—does not distract our attention from this fundamental task.

Recent Economic Events

Although the economic changes of the past year have been massive, the fact is that as yet no one can clearly see their extent or predict their duration.

The industrialized nations have reacted to the rising prices of petroleum and other commodities, and to the worldwide inflation, in ways that have reduced national growth rates. Although these countries have been pursuing policies designed to help them adjust to the higher costs of energy and to the other inflationary forces, with minimum impact on production and employment, some slowdown of their economies following a period of very high growth was inevitable.

As for the future, a return to the 5 percent rate of growth realized in the Sixties would require both effective measures for reducing inflation without reducing production, and, equally importantly, the orderly recycling of the surpluses of the Organization of Petroleum-Exporting Countries (O.P.E.C.) to finance the structural deficits of the industrial countries.

Some countries—for example, Thailand and the Philippines, whose reserves have benefited from buoyant export prices, and Turkey and Yugoslavia, which have received substantial remittances from their workers abroad—can partially finance the heavy 1974 trade-account deficits and can avoid severe deterioration of their growth rates. The prospects of other countries, such as Korea and Brazil, which have been steadily expanding their export of industrial goods, are much better than those of countries dependent on agricultural exports.

The developing countries must do much by themselves, particularly in restructuring their patterns of use and procurement of energy and even more in expanding their production of cereal grains.

Restructuring Patterns of Use and Production of Energy. The impact of the petroleum price increases on the balance of payments of the developing nations could be diminished, of course, if those nations could reduce their consumption of imported petroleum—either from a reduction in their consumption of energy in general or through a shift from imported petroleum to domestic sources of energy supply.

While greater efficiency and conservation in energy use may be feasible in some cases, the amounts involved will be small. On average, the 1 billion people in the countries that have per capita incomes below $200 consume only about 1 percent as much energy per capita as do the citizens of the United States. Reduction of energy consumption in those countries in any significant degree can only lead to reductions in industrial and agricultural production and to a lowering of the standards of living for the masses of the population.

The outlook for substituting other forms of energy for petroleum is brighter. It will be possible in many countries—for example, India, Pakistan, Brazil, and Turkey—to generate power by using alternative energy sources. Petroleum-based plants can be replaced with hydropower, geothermal power, and with coal, lignite, or nuclear-fuel plants. But even in countries where these alternative energy sources are available (and in some, such as Kenya and Upper Volta, this prospect is very uncertain), exploiting these sources will require time-consuming geological or hydrological surveys and very large additional capital investments.

Expanding the Production of Food Grains. Although there has been a reasonable long-run balance between sup-

"For the last time, I don't take in boarders!"

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ply and demand of food grains for the world as a whole, there has been a serious and growing shortage of food production in the developing countries. Unless remedial action is taken, the situation will become much worse. The principal reasons for the shortage have been the rapidly expanding population in these countries and their failure to achieve satisfactory levels of agricultural productivity.

There is only one answer to this problem: The 2.9 percent rate at which the developing countries have increased their output of food grains over the past two decades must be increased substantially.

This can be done. Grain yields in the developing countries are no more than 40 percent of the yields in the developed countries. The developing countries do have the potential for increasing their agricultural productivity. But that potential cannot be realized unless the developing countries themselves initiate action on a wide front, including measures to expand the cultivated areas under irrigation, to promote the availability and the use of fertilizer, and to maintain a price structure that provides farmers with adequate incentive to grow more food. These are the prerequisites to increasing productivity, and they will require substantial sums of capital.

Investments in world-fertilizer capacity have been inadequate for coping with the sharp increase in the demand for fertilizers in the major grain-exporting countries of the Organization for Economic Cooperation and Development (O.E.C.D.) and in the developing countries that have been modernizing their agriculture.

Many developing nations have already initiated action to conserve energy and to explore alternatives to continuing increases in petroleum imports. Some have started to reduce their dependence on imported food grains.

The most important single step the developed nations could take to assist the 1 billion people of the poorest countries would be to recognize that the effects of inflation alone require—and will continue to require—major increases in the appropriated money values of Official Development Assistance (O.D.A.).

The O.P.E.C. countries are beginning to help meet the capital requirements of the developing nations, including making contributions to O.D.A. that are larger in proportion to gross national product than those of the O.E.C.D. nations.

The O.P.E.C. countries have already taken a number of initiatives that may lead to an increase in the flow of their development aid. These range from Iran and Iraq's agreements to supply India with specified quantities of oil on deferred-payment terms to the creation of the Saudi Arabian Development Fund and the very substantial expansion of the Kuwait and Abu Dhabi Development Funds.

The Overview

Although many ingredients have contributed to the current economic turbulence, at least three principal and interrelated factors are of major significance for the development scene. One, of course, is inflation. Itself the troublesome child of many forces, not only does inflation penalize the poor proportionately more than the rich and severely erode the value of O.D.A., but also, in leading to lower growth rates in the developed nations, it threatens to reduce demand for the developing countries' exports as well as to trigger protectionist tendencies.

The second factor is the sudden surge in the price of petroleum. Though it has contributed to balance-of-payments problems in many nations, it has had the greatest impact on the poorest countries. They possess neither the flexibility of the developed nations to readjust trade and investment nor the margin to reduce consumption.

And the third factor is the general boom in most other primary commodities. This has clearly benefited some developing countries. But it has also created further difficulties for the poorest nations, whose exports simply cannot offset the price increases for fertilizer and food, which, in combination with the increases in oil and manufactured goods, have substantially reduced their terms of trade.

If, then, we survey the development scene as a whole, it is evident that countries with some 20 percent of the population have registered a net gain: the oil-exporting countries and some of the mineral producers.

For certain other developing countries, representing about 30 percent of the total population, the long-run outlook is good, although they face serious problems of adjustment to the new conditions. Most of them are in the middle- and upper-income categories of developing nations. They should be able to borrow much of what they need on the world capital markets if the recycling mechanism is designed and managed with their needs in mind.

But for the poorest of our member countries—which represent fully half of the total population of all the nations we serve and contain 1 billion human beings—the situation is desperate. Almost every element in the current economic situation has worked to their disadvantage and has been compounded even further for many of them by the natural disasters of flood, drought, and crop failures. These countries, then, need additional assistance on concessionary terms, and they need it promptly: $3 to $4 billion more per year in the remaining years of the decade.

Can such assistance be mobilized in the current economic environment—an environment in which the real per capita incomes of many of the largest donors have decreased in the past 12 months and all traditional donors face severe inflation, unacceptable unemployment, and uncertain growth prospects?

I believe it can—and I believe it must.

The World's Wealth

The world has not suddenly lost its wealth. The O.P.E.C. countries have gained huge amounts, and the traditionally wealthy nations continue to be wealthy. They are less wealthy than they hoped to be at this time, but they are more wealthy than they were as recently as 24 months ago and immeasurably more wealthy than the nations of the developing world.

What, after all, really constitutes wealth? And what more fundamental measures of wealth are there than the levels of nutrition, literacy, and health? It is in these terms that the average citizen of a developed nation enjoys

(Continued on page 108.)

FRASER YOUNG
LITERARY CRYPT NO. 23

A cryptogram is writing in cipher. Every letter is part of a code that remains constant throughout the puzzle. Answer on page 54.

I QNIZ OAPIJ OAEXQ CN Q'UWLXNIWNQ IK RAET WSAEKUJB UZ WSN ONTN HAJWHUAEW AZ UK.

W K N J Q S I X

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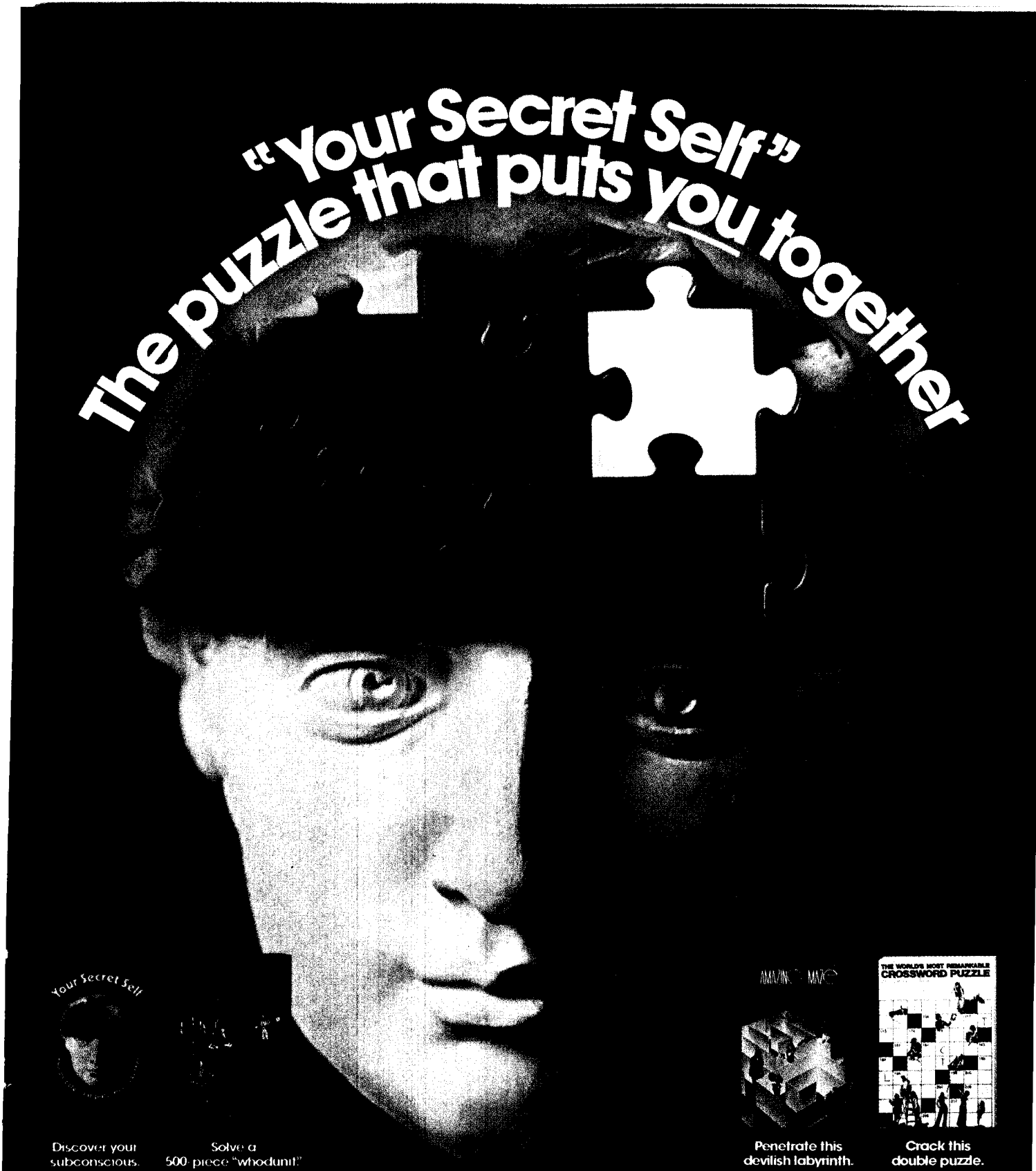
"Your Secret Self" The puzzle that puts you together



Discover your subconscious.

Solve a 500-piece "whodunit."

Penetrate this devilish labyrinth.

Crack this double puzzle.

Introducing a revolutionary concept in puzzles. A puzzle that lets you have fun discovering your subconscious thru the use of colors. The way you put the colored pieces together reveals your secret self.

You may find that you're pragmatic. Or impulsive. Animated. Or reticent. Just remember, you are what you put together. So if you don't like yourself today, you can put yourself together again tomorrow!

"Your Secret Self" is just one of four exciting new puzzles you play games with. Three more include "The Mystery of the Musical Requiem," "The Amazing Maze" and "The World's Most Remarkable Crossword Puzzle." All make great gifts for the hard-to-please puzzle lovers!

New from Springbok. Jigsaw puzzles you play games with.

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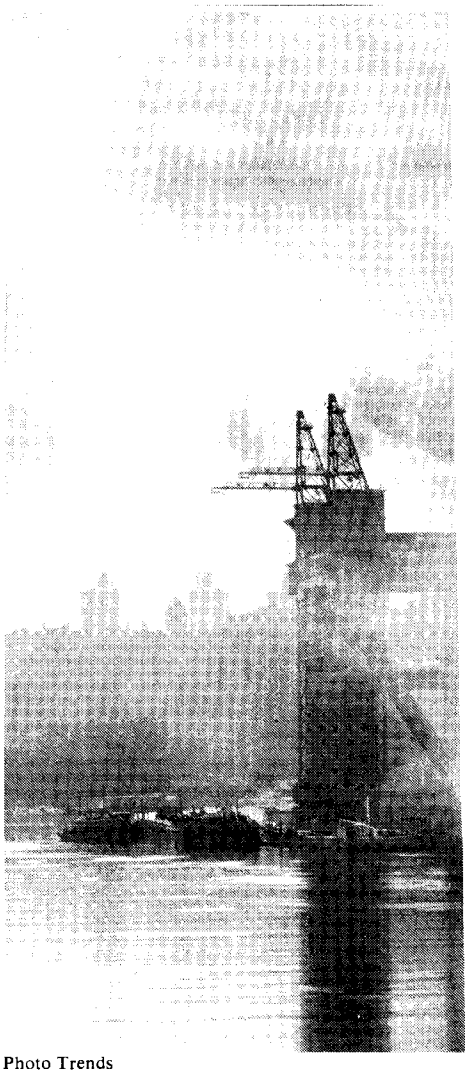

Photo Trends

Con Ed Polluting the Air, Harle

Yes—The Environment Can Be Saved

While the argument rages between doomsayers and debunkers, we must decide now on what is advisable for mankind, not what is inevitable for the planet.

by William Ruckelshaus

In June of 1972 I was administrator of the U.S. Environmental Protection Agency and in that capacity was a delegate to the first worldwide conference on the environment in Stockholm, Sweden. While there I hosted a luncheon for all the African delegations south of the Sahara. For four hours all of us present discussed the environment as a global issue. Before that luncheon I knew intellectually that the less-developed countries of the world viewed the environment differently than we did. Afterward I understood the difference viscerally. To the African delegates the issue of the environment was created out of whole cloth by the developed countries of the world to keep them less developed. Their primary concerns were providing their people with food, clothing, and shelter. When that was done, they would worry about the environment.

I was trying to convince them that they needn't repeat our mistakes in the process of meeting the legitimate material aspirations of their people. I shall never forget how during my plea the minister of the environment from Ghana jumped to his feet and shook his finger at me, saying, "You just don't understand. Let me give you an example of how my people view the environment. If you discovered a widely used pesticide was killing fish, your people would demand that you ban it. In Ghana my people would use it—to kill fish—and then eat them. That a pesticide had such lethal capacity would be good news to them." Obviously, the problems of protecting the environment in Ghana were not the same as in America.

Last April, I was in Nairobi, talking to many of the people working for the United Nations Environmental Program (U.N.E.P.). I remember a conversation over coffee that I had with a Pakistani, who was advising U.N.E.P. about energy policy. He suddenly asked me, "Do you know what is the number-one environmental problem in the world?" With some curiosity I confessed I did not and asked him what it was. He replied with great assurance and no hesitation, "poverty."

Although we often assume universal agreement on what we mean by "environment" or what criteria should be applied to determine whether it was "saved," there is no agreement about either. Understanding this is crucial to avoid needless disputes stemming from different assumptions.

To the Ghanaian and the Pakistani, the environment meant people and their immediate problems. They were concerned about clean air and pure water, but these are clearly secondary to providing the people of their societies with the necessities of life. Without debating the validity of their priorities, let me define my terms.

By *environment* I mean those natural things that surround us, from the essen-

William Ruckelshaus, first administrator of the Environmental Protection Agency and former deputy attorney general, practices law in Washington, D.C.

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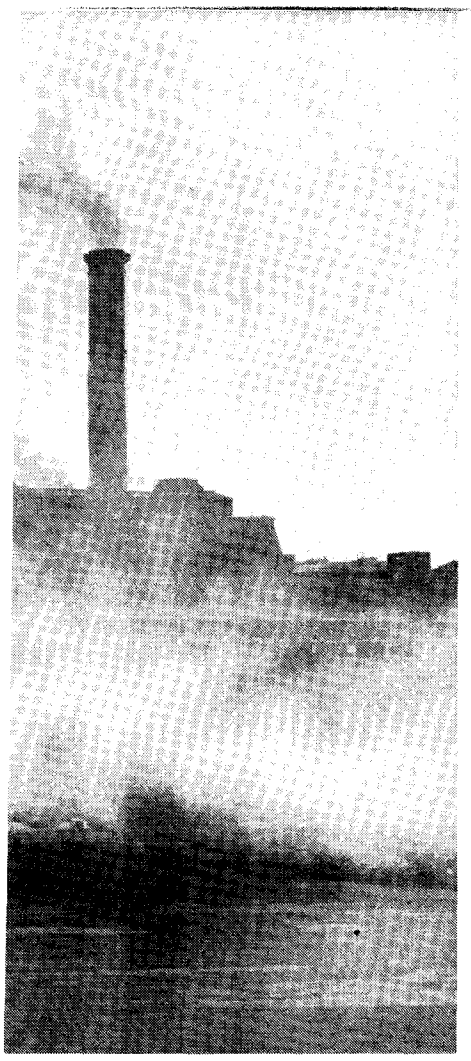
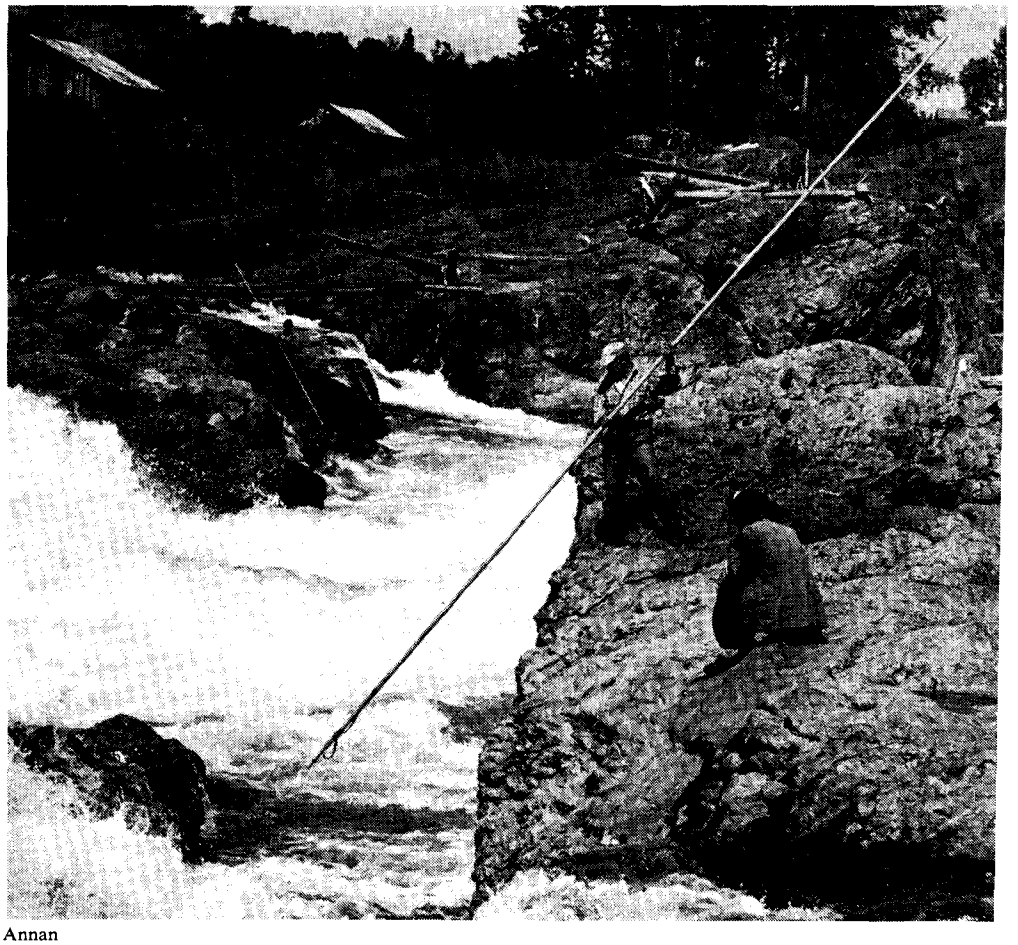


iver, N.Y.—*"How much can we lose?"*



Annan

Indians Fishing for Salmon, Bulkley Falls, B. C.—*"Preserving the essentials."*

tials to sustain human life, such as the earth's atmosphere or healthy air or drinkable water, to the non-essentials that nevertheless make life sustainable, such as wild animals or wild places or human living space. Preserving the essential ingredients of life and the rich natural diversity of the planet is to me inherently worthwhile. To concentrate on this does not deny the validity of other human concerns but rather limits the reach of this inquiry.

Beyond that, whether we have "saved" the natural things that surround us involves elements of judgment and criteria for measurement. Preserving all of the wide diversity of the planet as we now know it would be "saving" the environment in the absolute sense. Even this would not be enough truly to save all the environment, because some rivers or lakes or airsheds would have to be restored, not just preserved. Short of preserving all of the things that surround us—which is probably impossible—how much can we lose and still claim salvation? This is where judgment enters.

It is my belief that in spite of the incredible complexities of the modern world, we can preserve the essentials of life and enough of the non-essentials to claim victory.

Some of the species currently on the endangered list will undoubtedly vanish from the earth. More rivers and lakes and airsheds will be polluted. The release of toxic and persistent chemicals and compounds will continue and could cause adverse local or even global health effects or ecological disruptions. In the foreseeable future population will continue to increase, natural resources will diminish, and the carrying capacity of the planet will be challenged. Of course, natural disasters that have occurred throughout the history of the world will recur and could do us in, regardless of man's best efforts.

It is precisely these kinds of projections that have led some to predict doom and to give up and others to recommend drastic reordering of our national and world institutions to cope with impending disaster. This group, whom we may justifiably call the "doomsayers," is in turn attacked by the "debunkers." The latter's claim is that the world models and exponential projections made by the doomsayers do not bear up under scientific inquiry or an examination of the history of worldwide trends. We needn't worry, they say, as our world is capable of feeding over 60 billion people. There are substitutes available for all of our diminishing resources. Chemicals can be controlled; rivers and airsheds can be restored. Yes, we will lose some species, but this has been part of the condition of life throughout our planet's history. Besides, the exponential projections of population, pollution, and economic growth of the doomsayers will not occur, because historically forces have combined to halt similar trends.

Thus the argument continues to rage and, in my judgment, because of its growing vituperation and the unprovable projections of both sides, obscures rationality and impedes action. While we argue about what is or is not *inevitable* for the planet, we fail to think

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about what is *advisable* for man. Will population outstrip the ability of the earth to sustain it and result in a collapse of society as we know it? I don't know, nor does anyone else. We should keep trying to get the answer, but in the meantime we should be asking ourselves whether twice as many people on the earth in the next 33 years is a good thing—is it advisable for man?

We *may* be able to continue, with adequate controls, to release chemical compounds into the environment without rendering the planet uninhabitable, but is this prudent? Is it advisable for man? I could go on, but my point is that we needn't finally answer the questions raging in the debate between the doomsayers and the debunkers in order to act wisely. While many of the participants in the debate would admit this, the positions they have staked out and the thrust of their argument fosters inaction through the creation of an excess of despair or false hope.

Yes, the environment can be saved to the satisfaction of all but the most atavistic preservationist if we exercise prudence. First, some things have to be done. We must distinguish between saving the essentials and saving the non-essentials. All should be able to agree that we need air, water, and land of sufficient quality to sustain life. We must take steps to ensure that adequate research and monitoring are being done so these precious resources are preserved. We must recognize air and water and land as finite resources. They can be used up. When we consume them, there is a planetary cost. Or in the terms of the economist, air, water, and land must be viewed as capital, not income. This will not be easy and will take a considerable wrench in the philosophy or beliefs of much of the world.

To preserve the essentials, we must ensure that before we release new persistent chemical compounds into the environment in massive quantities, we adequately test their impact. The massive release of chemical compounds that nature cannot break down quickly and easily is of dubious wisdom. The time to test these new compounds is *before* they are released. Once a substance like D.D.T. comes into widespread use, many people and even societies in the world come to rely on its continued use. Removing it then becomes much more difficult, and the process of removal itself has its own adverse environmental impact.

We must continue to examine carefully the predictions and world models of the doomsayers. The fact that some of the models used are not scientifically verifiable or that strongly asserted facts turn out to be questionable assumptions should not deter us from continuing to improve our ability to predict the future based on what we know of the present. The questions raised by the doomsayers are legitimate ones. Successfully debunking an answer proferred does not eliminate the question. We must seek the real answer instead of reveling in a Pyrrhic victory.

"This is pretty old-fashioned. Let's play it with credit cards."

We need to understand more about the political, religious, and cultural roadblocks to necessary change. If in our continued examination into the assumptions of the doomsayers, we find one of them to be incontrovertible or the evidence of impending calamity overwhelming, we need to be able to respond quickly. This response can be effective only if we have anticipated the factors that will inhibit it and have planned for their neutralization.

For instance, if one of the chemicals now in widespread use should prove to present a real health hazard to man or the planetary ecosystem, what are the political factors inhibiting its quick and effective control? Likewise, what are the cultural or religious barriers to effective population control if it could be overwhelmingly demonstrated that such control was necessary for man's survival?

Starting with the assumption that all things politically possible can be done, we should not underestimate the difficulty in effecting international institutional change to cope with the emerging challenges to the environment. The fragility of U.N.E.P. itself is a case in point. The agency is barely two years old and finds itself beset with organizational problems, located geographically as it is in Nairobi and out of the orbit of its sister U.N. agencies. Further, U.N.E.P.'s continued financing is subject to the whim of the participating countries. There is overlapping jurisdiction with the World Health Organization (WHO) and the Food & Agriculture Organization (FAO), and there is no U.N. machinery for resolving the inevitable disputes.

OPTIMISM MUST BE TEMPERED with reality. Since 1972 the nations of the world have convened worldwide conferences on the environment (Stockholm—1972), population (Bucharest—1974), control of the sea beds (Caracas—1974), and food (Rome—1974). The institutional changes resulting from these conferences have been few and, so far, tentative. The failure immediately to form effective international bodies to cope with ill-defined problems should not be surprising. The ties of national sovereignty are strong and tight. Man has never shown a propensity to change his style of life or traditional loyalties unless the case for doing so is overwhelming.

As a microcosmic example, the case for the people of Los Angeles, Calif., to

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search seriously for alternative modes of transportation would seem to be very strong. The air is foul; the noise, congestion, and inconvenience are constant; and the Los Angeles basin approaches the limits of its carrying capacity. Still the automobiles increase faster than the population, and the public pressure to change is at best sporadic. My point is that just as in Los Angeles, so in the rest of the world, people will tolerate much and still not demand fundamental change—particularly where the change demanded will affect a long-cherished possession, such as national sovereignty or an automobile.

Clearly, one of the missing elements needed to effect change necessary to save the environment is world leadership. Although it is impossible to prove, I have the impression that at no other time in the history of our country have the people been so far out in front of our political leaders in their awareness of the complexity of modern life, their willingness to eschew easy solutions, and their receptiveness to new approaches to ordering their lives. My further perception, dimmer but nevertheless real, is that the same thing is true of much of the rest of the world. Any fair sample of speeches made by the world leaders at the aforementioned international conferences shows an appalling lack of vision. Instead there is a constant appeal to parochial interests, to a narrow world view, to traditional nationalistic, racial, and ideological divisions. The same is true regardless of whether the "leader" represents a developed or less-developed country, the Western or Eastern bloc, the Third World, or the Orient. Even when the rhetoric shows a spark of vision, the subsequent performance fails to meet the promise.

If, for example, we don't slow present population growth rates, what will it mean to man? If the earth can feed 67 billion people, as a recent report of one of the debunkers claimed, what happens to the quality of life of that incredible mass of people? If present trends continue, we will have 14 billion people on the earth by the year 2035. Is it a good idea to increase the number of people on our planet by 10 billion in 60 years? The answer to this question has nothing to do with our ability to sustain life for that many people but rather seeks to understand the relationship of that mass to the quality of life for the individual.

Clearly, the institutions charged with the production, transportation, and distribution of food to almost four times as many people as today inhabit the earth will have to have a degree of power and authority not possessed by any existing institutions. This will inevitably mean erosion of personal choice and individual freedom. Do we want this kind of world? Is it advisable?

We should be asking ourselves these kinds of questions and others. They should be posed with imagination and fervor by world leaders. Political answers need not await scientific certitude.

The environmental debate needs to be refocused. We can save those natural things that surround us. Man will sustain himself. But if in the process of survival we concentrate simply on avoiding calamity, we run the risk of denying to the individual the possibility of realizing his full human potential. That potential is more likely to be fulfilled if the things around us we save include wild animals, wild places, and room to swing our arms.

Yes, the environment can be saved, but we need to focus less on the inevitable fate of man and more on the quality of his journey, whatever the fate. □

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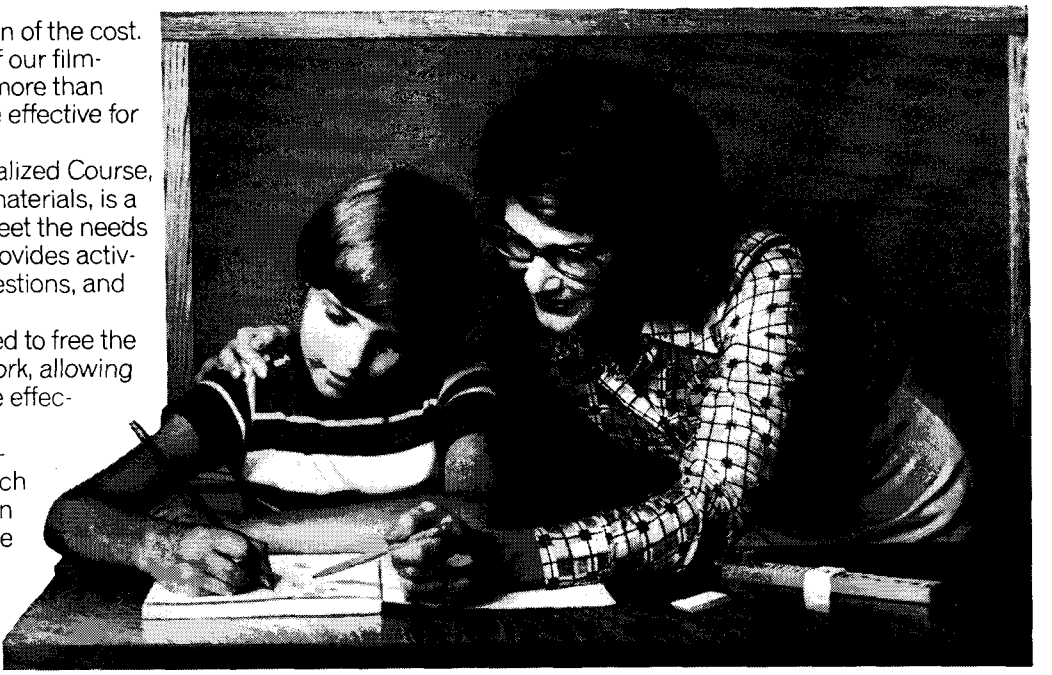

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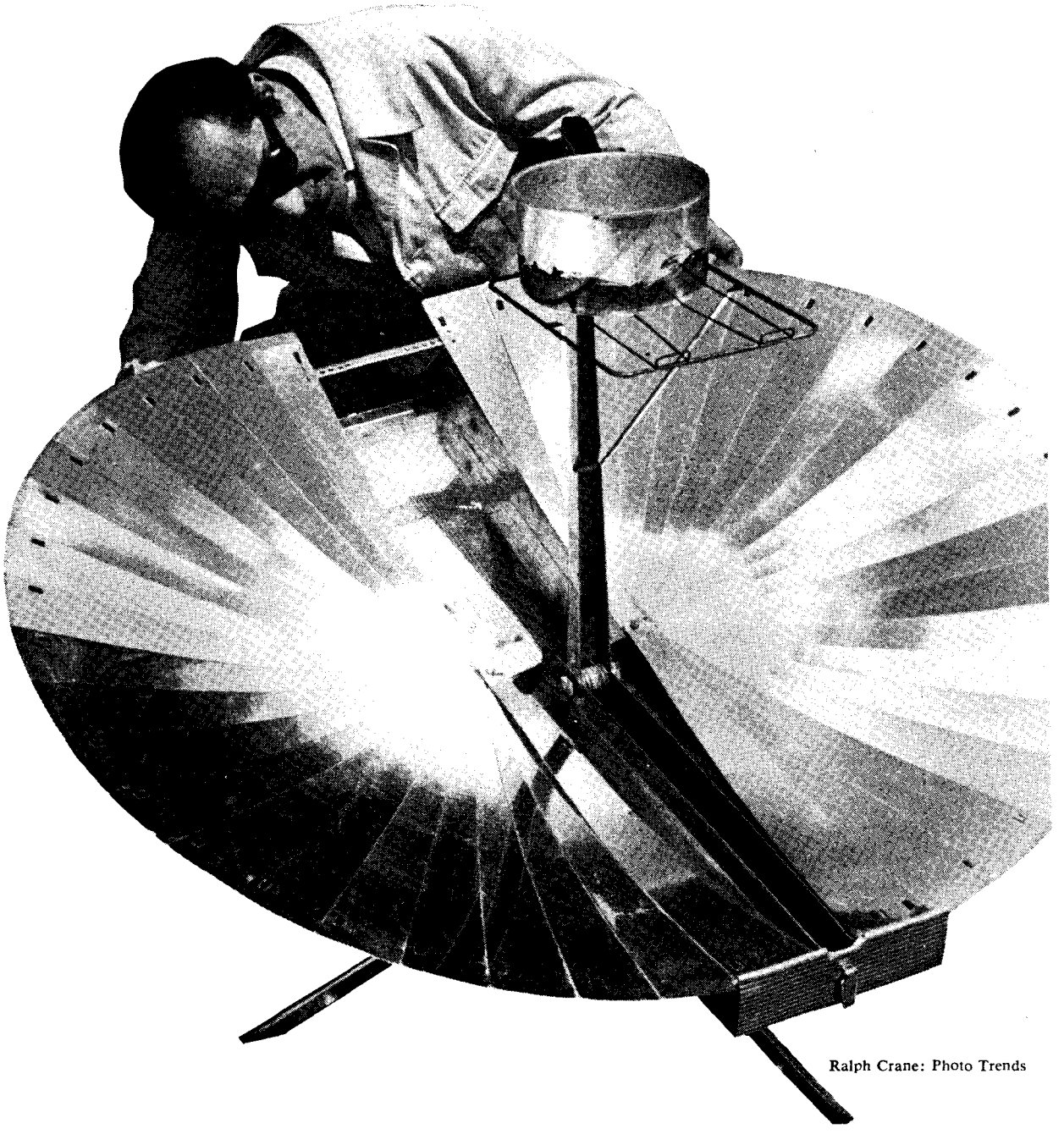

Ralph Crane: Photo Trends

Finding a New Approach to Energetics—Fast!

We must play a catch-up game, developing an energy-conservation ethic and finding new sources of supply, but the situation is by no means incurable.

by Glenn Seaborg

The traumatic impact of our energy crisis has provided us with a not-too-early recognition of the realities of the boundaries of our energy supply. Thus warned, we can get down to the business of planning for the future. Fortunately, we can foresee solutions to our energy problem provided that we can garner a national sense of determination which will guide us toward the conception and implementation of a coherent and realistic national energy policy. I believe we can and will.

The foundation for such an energy policy must be based on approximately equal doses of energy conservation and the development of additional sources through a judicious application of science and technology. Both of these prescriptions can be successfully applied provided that we have the courage to make some difficult choices.

We can—we must—develop an energy-conservation ethic in the United States. The energy that we waste in heating, in cooling and lighting poorly designed and badly insulated buildings, and in inefficient transportation systems contributes nothing to our standard of living. The large automobile, which has become the hallmark of the American way of life, is unnecessarily costly in the consumption of fuel, material, and space. We suffer as much from excess energy consumption as from energy shortage. More than 50 percent of the energy consumed in the United States is discarded as waste heat.

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Technical know-how and the laws of thermodynamics permit substantial reduction in this wastage through the development of more efficient engines, industrial products and processes, transportation systems, air conditioners, furnaces, household appliances, and the construction of better-designed and -insulated buildings. Some such waste heat can be used for heating homes and buildings, as the Soviet Union has successfully done. And each of us certainly can draw less from our energy bank and still get along very well.

On the energy-supply side, our most serious problem is on the short-time scale, until about 1985—a result of inadequate national planning. We have a plethora of possible technical solutions, which in general require 10 or more years of research and development. Had an adequate research-and-development program been in effect during the last 25 years, we would not be faced with our present dilemma. Now we must play a catch-up game—a difficult, but by no means hopeless, situation.

Let me make a somewhat more quantitative assessment of our energy problem and then turn to a discussion of the technical solutions. If we were to continue for another decade (until 1985) our recent rate of growth of energy consumption, about 4.5 percent per year, an increase of about 60 percent would result. Close to 50 percent of our energy today derives from oil, and we now import about one-third of our supply of this fossil fuel. As for the rest of our energy: About 30 percent is provided from gas (which we are importing in increasing proportion), less than 20 percent from coal, the small remainder from hydroelectric (whose practical potential essentially is exhausted) and nuclear power. To compound the problem, we are consuming oil and gas faster than we are finding new supplies, and in a few decades we will have depleted the supply of these resources. More than 90 percent of our fossil-fuel reserves, sufficient for meeting our needs for hundreds of years, reside in coal, which we are consuming at the lowest rate.

This then defines the dimensions of our problem: The solution must come in the two parts—substantial reduction in the projected rate of increase of fuel consumption and development of new sources of energy supply and conversion. I believe it is unlikely that we can attain in the short term (within the next decade) complete national independence in our energy picture. I do believe we can, with extraordinary effort, reach a state that might be termed *energy self-sufficiency*. By this I mean a national situation in which we could meet our absolute minimum needs so that we could carry on temporarily in an emergency. We would continue to meet our demands by imports but would strive by great effort to reduce them to as small a fraction as possible. To minimize this "energy gap," we must develop *all* our sources that have the potential of producing energy at an acceptable price and are compatible with reasonable environmental, health, and safety standards.

"As our domestic supplies dwindle and the competition for purchase on the international market increases, we will have to make the transition to a 'recycle society.' "

On the demand side, we can make large reductions—the 60 percent growth by 1985 is no longer an acceptable or responsible goal—by making savings such as I have indicated. But reduction to zero growth is not consistent with maintenance of a viable economy. Our goal should be the maximum reduction consistent with continuation of the productive capacity, employment base, and economic stability required for maintaining our standard of living. It is not possible to make a quantitative estimate of possible achievement within these constraints, but perhaps a reduction to half the recent growth (4.5 percent per year) is not unreasonable. Thus, *one important plank in our national energy platform should be to define and project the legitimate future energy needs of the United States.*

On the supply side we have many strings to our technological bow. Besides possible limited increases in our rate of recovery of domestic oil and gas, we can mine more coal and improve its utilization, continue and perhaps accelerate construction of nuclear-power plants, apply solar energy to the heating and cooling of homes and buildings, and begin to develop geothermal and wind-energy sources on a practical basis.

Oil recovery can be increased by exploration for new origins, including offshore sources, by using improved drilling techniques, and by additional recovery from already exploited sources (so-called secondary recovery). Oil from Alaska, transported via the famous trans-Alaskan pipeline, capable of increasing our supply by some 10 percent, will make little impact before 1985.

Coal is capable of making the largest contribution. As fuel for power-generating plants and industrial processes, it can be substituted for oil or gas, thus freeing them for their specialized uses as sources of chemicals, fertilizer, and fuel for transportation and reducing the import of these fossil fuels. Coal can be the source of gas through the gasification process and, together with oil shale, the source of oil through liquefaction; short of an extraordinary, unlikely, national effort, we can expect only limited contributions from these processes before 1985. The potential supplies greatly exceed those of ordinary gas and oil recoverable directly from the ground or sea. Such conversion processes, with an aggressive research and development program, can be economically competitive at the recent high prices for imported oil and gas but will require very large investments—on the order of tens of billions of dollars—and it will require the solution of serious problems of manpower, water supply, and land lease before production is achieved at appreciable levels.

As the result of a unique program of research and development during the last 25 years, an exception to the neglect that has contributed so much to our present plight, nuclear (fission) power is reaching the stage where it can make an appreciable contribution. In the United States the total nuclear-power capacity that is in operation, under construction, or committed for construction is about 200 million kilowatts, indicating that some 25 percent of all our electrical energy could come from the nuclear source by 1985. All of the industrialized countries are turning toward this source of energy, at faster or slower rates than the United States, depending on their domestic resources of fossil fuels.

All three of these categories of energy

Former chairman of the U.S. Atomic Energy Commission and Nobel Prize winner, Glenn Seaborg teaches at Berkeley and is the co-discoverer of plutonium.

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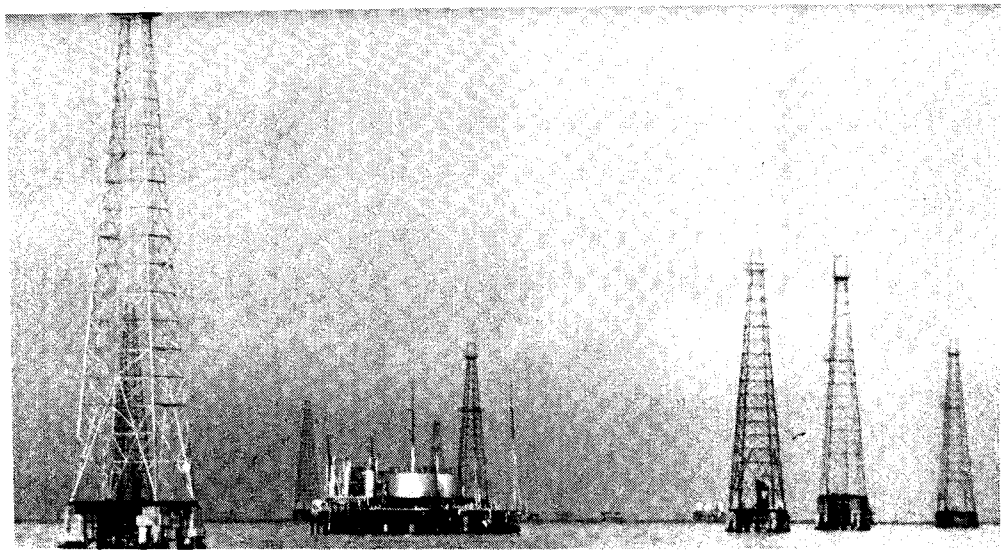

Oil Fields in Venezuela—*"If we continued our rate of growth of energy consumption, about 4.5 percent per year, an increase of 60 percent in 10 years would result."*

sources have problems, varying in degree, with respect to public health and safety, and they have an adverse impact on the environment, the preservation of which belatedly has now become our highest priority.

Oil recovery has the risks of leakage in offshore drilling, spills during transportation, air pollution from the burning of sulfur-containing sources. Natural gas and low-sulfur oil have clean burning properties and are almost ideal energy sources. However, they are severely limited in availability.

The use of coal suffers from serious problems in its removal from underground, the need for land reclamation after strip-mining, extensive new transportation requirements, and the need for removing air pollutants before, during, or after its burning. Air pollution from the burning of coal contributes widely to respiratory and heart ailments. A large number of coal miners suffer from black-lung disease and work-induced injuries. Conversion to gas and oil on an appreciable scale requires the mining of tremendous quantities of coal or oil shale, seriously aggravating our strip-mining and water-supply problems. These difficulties can be overcome by improvements in mining technology, location of electric generating plants at mine mouths, dispersal of air pollutants by high stacks, research and development to produce clean burning techniques, and development of underground (*in situ*) methods for conversion to gas and oil.

Although nuclear power does not contribute any noxious fumes or particulates to our air, it has offsetting disadvantages —a radioactive waste-disposal problem, the possible danger of widespread dissemination of radioactive fission products and poisonous plutonium, the problems of thermal pollution (in common with fossil fuels) and routine emission of low levels of radioactive effluents, and the possibility that fissionable material may be diverted for use in the production of weapons. These problems can be mitigated by the judicious design and placement of waste repositories, careful design and operation of the reactors, concentration of reactors, fuel fabrication and reprocessing plants in "energy parks," the use of cooling towers, and improved coordinated nuclear safeguarding procedures.

Of the other potential contributors on the early time scale—solar, geothermal, wind—the most help probably will come from some specialized uses of solar energy, although the others will give some aid. More than half of the United States has a sufficient supply of sunshine to allow the widespread use of solar energy in the heating and cooling of homes and other buildings. This technology can be developed rapidly; its implementation depends chiefly on the inception of a national energy policy that encourages or demands the necessary construction, renovation, and design changes.

Now let us consider the longer-range picture, beyond 1985. During the early post-1985 period, our hopes will ride on the expanding exploitation of coal, oil shale, and nuclear power, with increasing help from the other new sources. Beyond the year 2000, as our fossil fuels diminish, we will turn more and more to nuclear (including the new fusion power) and solar energy. Eventually we will consume all of our fossil fuels and will have to depend entirely on nuclear and solar energy.

Realistic projections suggest that 50 percent of our electric power might be generated through nuclear (fission) energy by the year 2000. This power will come chiefly from our present type of reactors—that is, conventional ones; but our national program contemplates the introduction of the breeder reactor before then, perhaps in time to make a contribution in the 1990s. The need for breeders is predicated upon the much greater efficiency that they have in the utilization of the nuclear fuel uranium, which is available in limited supply at the present purchase price. However, in order to find a place in our energy repertoire, the breeder will have to generate electricity at a cost competitive with that from non-breeder reactors, some of which can use both uranium and thorium as fuel with relatively high efficiency. Because the cost of uranium accounts for less than 10 percent of the total cost of electricity from any of the conventional reactors, the supply of uranium can be considerably increased by mining lower-grade uranium ores at higher cost without increasing the price of nuclear electricity to an unacceptable level. All advanced industrialized countries are working on the development of the breeder reactor with the objective of including it among their future energy sources. Some nuclear reactors have the long-range possibility of furnishing heat energy at temperatures sufficiently high to split water for producing hydrogen gas, a very versatile potential fuel; clean-burning hydrogen, from whatever source, can be used as fuel for industrial and central-station power plants, in automobiles, and for fuel cells (to provide individual sources of electricity), and it can be stored and transported with negligible loss.

The production of electricity and other forms of energy through controlled thermonuclear fusion—the source of energy of our sun—in the period beyond the year 2000 will make it possible for us to use the unlimited supply of heavy hydrogen of the world's oceans as nuclear fuel. They will provide an energy source that can meet the world's needs for millions of years. Technical feasibility has not yet been demonstrated, but there are indications that it will be achieved within the next 5 or 10 years. We will then have the scientific basis for the building of prototype and demonstration reactors preparatory to the construction of practical, large, economical fusion reactors. Research on nuclear fusion is proceeding in most industrialized countries. The effort

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You can help save Julyi Latemoon for $15 a month. Or you can turn the page.

Julyi Latemoon.
Descendant of a proud people.
Her ancestors understood
man's harmony with nature.
They were master craftsmen, farmers, and hunters.
Now they are a forgotten people
to whom many promises have been made.
And few kept.
Julyi is poor but has an abundance of hope.
She needs a helping hand.
And a friend who will understand.

For $15 a month, through Save the Children Federation, you can sponsor a child like Julyi so that she will not be forgotten. Give her an education so she can grow up to walk among her people with dignity and respect. And a portion of your $15, combined with money from other sponsors, will also help her family and the people of her community. With a desperately needed food co-op, income-producing handicraft programs, vocational training, youth activities, clinics, and more. In simple terms, help a proud people help themselves. For this is what Save the Children has been all about since 1932.

For you—educated, involved, and in touch with your own heart—there are many rewards. Correspond with a child. Receive a photo and progress reports. Reach out to another human being. That's how Save the Children works. But without you it can't work. So please: clip this coupon and mail it today. Now you can turn the page.

Save the Children Federation is indeed proud of the handling of its funds. An annual report and audit statement are available upon request. Registered with the U.S. State Department Advisory Committee on Voluntary Foreign Aid. Contributions are income tax deductible.

I wish to contribute $15 a month to sponsor a ☐ boy ☐ girl:

☐ **Where the need is most urgent**

☐ Appalachia (U.S.)	☐ Greece	☐ Korea
☐ Bangladesh	☐ Honduras	☐ Lebanon
☐ Chicano (U.S.)	☐ Indian (U.S.)	☐ Mexico
☐ Colombia	☐ Inner Cities (U.S.)	☐ Southern Black (U.S.)
☐ Dominican Republic	☐ Israel	☐ Tanzania
		☐ Vietnam

Enclosed is my first payment:

☐ $180 *annually* ☐ $45 *quarterly*
☐ $90 semi-annually ☐ $15 monthly
☐ Instead, enclosed is my contribution of $_____
☐ Please send me more information.

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David L. Guyer, Executive Director

SAVE THE CHILDREN FEDERATION

345 East 46th Street, New York, N.Y. 10017

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in the Soviet Union is particularly noteworthy; fortunately, we have excellent technical cooperation with the Soviet Union in this field.

Solar energy represents our ultimate source—continuously renewable, inexhaustible, available as long as our sun shines. The economical production of electricity on a large scale by solar energy offers many technical difficulties because of its low intensity, and predictions indicate that it will not be achieved before the year 2000. Imaginative proposals are under investigation, including "solar farms" for collecting and converting solar energy over areas of many square miles and the placing of solar-energy collectors and converters, more than one mile in diameter, into synchronous orbit 22,300 miles above the earth. Perhaps the best method for wide-scale utilization of solar energy will result from basic scientific discoveries yet to be made, such as the synthesis of chemicals capable of converting sunlight directly into electricity or into such fuels as hydrogen gas.

Geothermal energy is another natural source for conversion to electrical power. Available in specific areas on a worldwide basis, this has encouraging long-range potential. There are three main types—steam, hot water, and hot rock—which are found at varying depths below the earth's surface. Assessment of the ultimate total potential of geothermal energy, in terms of quantity, duration, and time scale, depends on a great deal of developmental work. The long-range future of wind energy is difficult to assess. The other natural sources, providing energy from the tides or temperature variations at different ocean depths, apparently have only limited practical potential according to our present understanding.

THESE LONGER-RANGE energy sources also have environmental problems, to varying degrees, although perhaps not so serious as those accompanying the use of coal or nuclear (fission) power. However, coal and nuclear power are the only new sources that can make large contributions during the next decade or the period immediately beyond. I believe that the benefits, including our increased economic stability resulting from the reduced outflow of dollars and our increased political autonomy and strategic security, outweigh the risks that I have outlined.

Recognition of our energy problem should prepare us for an inevitable, related series of future problems. Largely on the longer time scale, beyond 1985, these relate to the impending shortages of metals essential to our economy—copper, aluminum, chromium, nickel, tin, manganese, and so on. As our domestic supplies dwindle and the competition for purchase on the international market increases, we will have to make the transition to a "recycle society." At that stage of our development, virtually all materials will be reused indefinitely, and virgin resources will be used primarily as "make-up" materials. Akin to recycling is the potential conversion of organic wastes (garbage, manure, and so on), by hydrogenation, pyrolysis, or bioconversion, to synthetic fuels (oil and gas); and cellulosic wastes (wood and paper products), by microbial-produced enzymes, to edible protein and carbohydrate sources. A society set up to reuse most of its resources systematically and habitually will effect enormous energy savings. This eventually must be the industrial philosophy of a stabilized society.

I am confident we can play and win our catch-up game, made necessary by insufficient past research and development. Let me emphasize that *the other major plank in our national energy platform should be to establish programs—including research and development—and timetables for applying our technical solutions to the energy problem.*

I believe we will exhibit the sense of determination to evolve the coherent and realistic energy policy necessary for ensuring the continuing and sufficient domestic supply of energy so vital to our well-being and to the very survival of our economy. □

"Good heavens! It says 'Grown in Japan.' "

WIT TWISTER NO. 36

Edited by Arthur Swan

The object of the game is to complete the poem by thinking of one word whose letters, when rearranged, will yield the appropriate word for each series of blanks. Each dash within a blank corresponds to a letter of the word. Answers on page 54.

Slow ___ ___ ___ ___ ___ took folks to
town in years gone by,
In ___ ___ ___ ___ ___ to shop, to
labor, or kibitz.
Now cars and buses, fuming, swiftly
hie—
Thus making eyeballs ___ ___ ___
___ ___, if not our wits!

Contributed by Louis J. Kleinman, Louisville, Ky.

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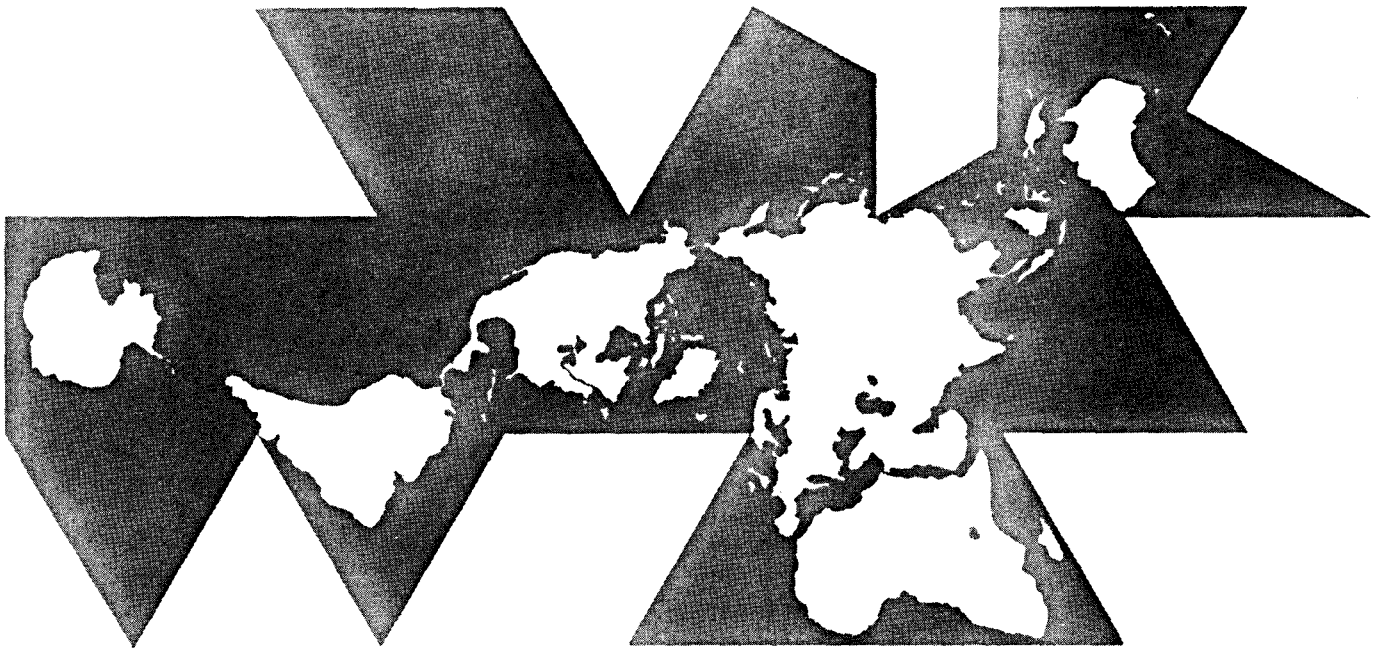

Check One:

- ☐ 1. All our resources are infinite; there's no need to worry.
- ☐ 2. All our resources are running out; we are doomed.
- ☐ 3. Some resources are reuseable; some are not; the hope for the future lies in how we use them.

If you are inclined to check box #3, continue reading.

The Design Science Institute is committing the major part of its present activities to exploring and expanding the hope expressed in proposition #3.

National policy makers proceed as though unaware of this option. They practice strategies, such as "war games", for the survival of only part of the human population.

R. Buckminster Fuller, to whose ideas the Institute is committed, operates as mountaineers do, on the principle that success will be won by all together — or by none. As a positive alternative to the war games of the nations' planners, he has introduced his concept of World Game: a computerized system which, accepting the finite character of Spaceship Earth, recognizes the regenerative principles of the natural economy, and proposes taking advantage of the potential of most major resources to exist in perpetual use cycles.

The Design Science Institute is continuing the preparation of World Game as a comprehensive tool to make available an understanding of the whole Earth and all its resources — their form; their flow patterns; and their potentials — and to search for and develop scientific design solutions to problems of global significance.

To start with, the Institute will analyze and synthesize data concerning the availability and distribution of energy. Preliminary studies have indicated that sufficient information can be marshalled to present for the first time a global picture of our energy resources. Without such an overview, planning for our future must remain a haphazard and politically oriented exercise.

This is a project for everyone. Now, when the crises of humanity are beginning to break over our heads, and the solutions to our problems are only beginning to be developed — now, most of all, we need and want your help.

World Advisory Council:

Arthur C. Clarke
Constantinos Doxiadis
Walter Hickel
Margaret Mead
Jonas Salk
U Thant
Jerome Weisner

I enclose a tax-deductible contribution to the Design Science Institute in the amount of $_____.

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If you make a contribution of $10.00 or more, and would like to receive descriptive material concerning the Design Science Institute and the World Game, check here: ☐

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Medicine's Mighty Molecules

An adventurous, broad-spectrum approach to all human illness and health, from birth defects to aging, may prove to be medicine's magic key.

by Albert Rosenfeld

Molecular medicine holds out the greatest hope science can offer in the remaining quarter of this century for the alleviation, treatment, cure, or prevention of the major ailments that afflict us. More than just a quirky new subspecialty, molecular medicine is an adventurous, broad-spectrum approach to all human illness—and health.

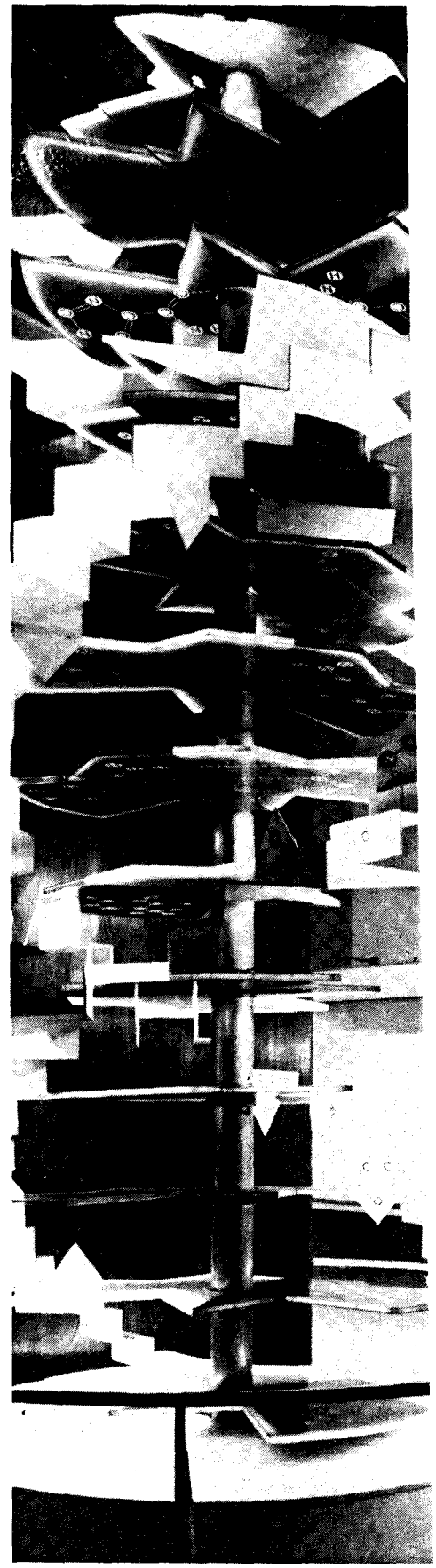
The study of disease at the amazingly miniaturized level of the molecules within the patient's cells, molecular medicine may provide the answer to heart disease, stroke, cancer, arthritis, kidney disease, diabetes, genetic defects, senile dementia, autoimmune and immunodeficiency diseases, and the remaining viral and bacterial infections, including the common cold. It may even encompass the alteration of the aging process itself as well as the cure of many of the behavioral disorders we have heretofore thought of as "mental" illness.

Much of medicine today consists of heroic and spectacular forms of therapy that excite—and deserve—our admiration. We rescue many victims of maladies formerly deemed hopeless. We perform hours-long triple-bypass operations on their failing hearts and provide cardiac-intensive care. We dialyze them on artificial-kidney machines, transplant vital organs, then suppress their immune systems in order to keep the foreign grafts from being rejected. We surgically excise not only cancers but also large quantities of tissue suspected of harboring cancer cells, then give massive doses of radiation and administer powerfully poisonous chemicals. We implant synthetic parts, which can be monitored electronically at long distance. The catalog of lifesaving strategies is long and impressive.

But all this marvelous technology requires costly upkeep, elaborate facilities, complex machinery, and highly trained and dedicated personnel. If we continue in a similar fashion, by the end of the century we will find ourselves spending an enormous portion of the national budget just to keep sick people alive from one day to the next. Moreover, these gigantic efforts can seldom guarantee any long-term cure or even really significant prolongation of high-quality (that is, productive and enjoyable) life. It must all be done, of course, because in so many cases it is the best we can do. Yet, taken all in all, it really represents only a holding action until such time as research provides us with better solutions. The difference is like comparing the iron lung to the polio vaccine.

Medicine does already, of course—and has in the past—employ what might be termed molecular medicine. A vaccine, for instance, operates at the molecular level; so does an antibiotic that kills a specific infectious microbe. More often than not, though, we have achieved these results pragmatically without understanding how or why the treatment worked—only that it did work. With our rapidly accumulating biological knowledge, however, we can now be more calculating about it. The pharmaceutical companies' research endeavors, of course, represent a sophisticated quest for molecular remedies.

The adult human body is made up of some 60 trillion cells. These come in many shapes and sizes, but each of them contains in its nucleus the selfsame package of genetic instructions in the form of DNA molecules—faithfully duplicated at each cell division, from the original fertilization of the egg through maturity. Few things in the universe are more beautiful to contemplate than those 60 trillion cells, exquisitely orchestrated by the control mechanisms of life, functioning harmoniously in a healthy human being. But if even a single critical detail



UPI
Model of DNA Molecule Structure, New York Museum of Natural History.

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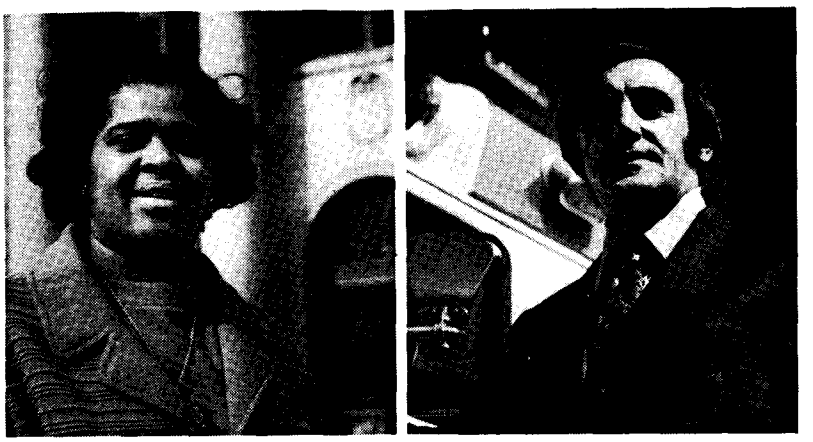
Esther and Ed

Esther Lee is a full-time clerical employee at Bethlehem Mines in the corporate headquarters at Bethlehem, Pa. In her "spare" time, Mrs. Lee is a school board director and serves on other community organizations involving church, government, education, youth, and minority groups.



Ed Skufca, a supervisor in the Railway Car Department of our Johnstown, Pa. plant is President of the 7th Ward Civic Association. One of their many community contributions is the volunteer ambulance corps that serves the 42,000 people of Johnstown.

and Rudy and Irma

Rudy Salinas, a bricklayer at our Los Angeles plant, works with several organizations that try to get Mexican-American youth and their parents and teachers working together—to prevent drop-outs, encourage post-high school education, and provide scholarship funds.

Irma Foote is a special assistant in our San Francisco Public Affairs Department. Each week during the school year, she devotes one night to helping Chinese youngsters with their homework, stressing reading, spelling, and pronunciation.

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of those genetic instructions is misread, mistranslated, destroyed, or distorted in even a single cell, the result can be the beginning of, say, cancer.

Thus the whole person's welfare is dependent on the well-being of those molecules—the nucleic acids (DNA and RNA) and proteins (including enzymes). Even an individual's memories, his lifetime experience, his own consciousness of his own identity, are believed to be coded into the molecular configurations of his brain cells.

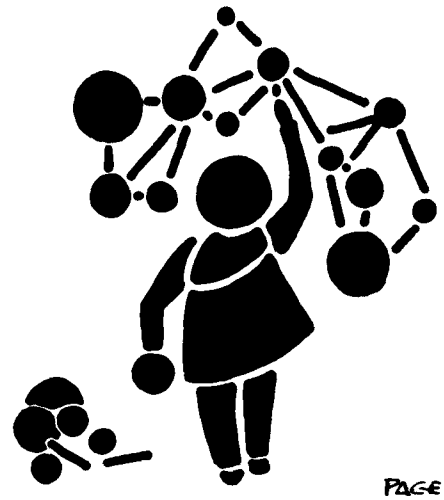
THE PRINCIPAL BUSINESS of every cell is protein manufacture. The cell makes protein for renewing its own substance and also for export to other cells. (A living organism is, of course, a cooperative enterprise where a lot of lively trading goes on.) Protein molecules occur in millions of varieties, but they are all made of smaller molecules called amino acids, 20 in number, which are derived from food. The cell uses food as both fuel and building material. The production system, oversimplified, is as follows: *DNA*, the master genetic molecule, instructs *RNA* how—with the help of *enzymes*—to put together *proteins* (including more enzymes) out of *amino acids*. That's the basic story. As long as this process goes on without error, the cell remains healthy.

But things can and do go wrong. Virtually every disease is either *caused* by something amiss in the molecular machinery or *causes* some molecular mishap or malfunction—which is what makes us feel sick. In a viral infection what happens is clear: The virus's DNA or RNA insinuates itself into the invaded cell's nucleus. It may just lie dormant there, in which case we have no symptoms, therefore no disease; or it can take over the cell's genetic apparatus and instruct it to manufacture nothing but more viruses, in which case we are said to "have a virus"—which could be anything from flu to encephalitis. Many scientists suspect that viruses which are potentially cancer-causing may lie latent for many years before they are triggered into activity by sudden stress or injury to the cell.

Inasmuch as the same basic systems are universal in all cells (though there are infinite variations on the same themes), it is easy to see how they can be involved in many kinds of disease. On a recent visit to the National Institutes of Health, I asked a dumb question: In which of the national institutes was genetics research being done? I should have known the answer: in all of them. It's almost impossible to do basic biomedical research these days without dealing in molecular genetics. Whether you are working in cancer, aging, immunology, birth defects, or any one of a number of other fields, you all are seeking the same kind of genetic information that involves the cell's basic protein-making processes. Many lines of research are converging in a fascinating way so that it is often impossible to put a single-disease label on what you are doing.

As one example of the power of a single enzyme: Not long ago, I visited the lab of biochemist Creed Abell at the University of Texas Medical Branch at Galveston. Abell has been doing basic research with an enzyme called phenylalanine ammonia-lyase (PAL). PAL inhibits the formation of phenylalanine—an amino acid that is needed by all cells. Now, among the other research projects going on at the U.T.M.B. campus, there is one in cancer and one in the biology of schizophrenia, and Abell has figured out ways to use PAL in *both* programs.

His strategy for cancer was based on a single fact. While all cells need phenylalanine, normal cells can get by with a substitute, phenylpyruvate, but



some cancer cells can't. Abell tried treating leukemic mice, first by giving them PAL to deprive all the cells of phenylalanine, then administering phenylpyruvate—which rescued the normal cells but permitted the cancer cells to die. His success rate has so far been impressive.

But what does this have to do with schizophrenia or with any mental disorder? This: Phenylalanine is essential at one step in the formation of the brain chemical, epinephrine. Changes in epinephrine levels can alter behavior radically. Working with squirrel monkeys trained by his colleague, neuropsychiatrist Ernest Barratt, Abell gave them PAL—which changed their sleep patterns, made them forget complex tasks that they had learned, and, in short, gave them different personalities. Everything returned to normal once the PAL wore off.

How might this kind of molecular manipulation bring about breakthroughs in the major diseases? Let's look at a few sample aspects of birth defects, heart disease, cancer, and aging:

BIRTH DEFECTS. In some genetic disease a single faulty gene can result in a structural defect in a single enzyme molecule—and if it happens to be an enzyme required for the functioning of many different cells, then the illness can be widespread and devastating. A birth defect such as Tay-Sachs disease strikes at infants that start out in life looking perfectly healthy but are soon in trouble. They don't learn to sit up or crawl. They usually go blind and then die by the age of two. We have no remedy or cure so far for Tay-Sachs, but through molecular knowledge we now have a diagnostic test so that a prospective parent who carries the gene can at least be forewarned.

We are not even that far along in such genetic diseases as Huntington's chorea, where the symptoms do not begin to occur until the age of 35 or 40. Then an inexorable, progressive deterioration begins and goes on for 10 or 15 years before the patient dies. This is the disease that struck down Woody Guthrie; now his talented son, Arlo, has a 50-50 chance of coming down with it. What is the hope for this type of genetic defect?

As one example, we can take galactosemia, where a single missing enzyme destroys the ability to metabolize milk and causes galactose to accumulate, resulting in a variety of symptoms (jaundice, cataract, gastrointestinal disorders, retardation). It can also be fatal. In 1971 Carl Merril and his associates at NIH took skin cells from a patient with galactosemia. Using a virus called lambda phage, which knows how to make plenty of the missing enzyme, they were able to transfer the genetic information, via the virus, to the skin cells—which then were able to process galactose. They had corrected, in tissue culture at least, an inborn genetic error! When this kind of know-how can be ap-

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IBM Reports

The computer and productivity

At a time in which many economic axioms are being severely tested, one stands firm. Today more than ever, productivity is recognized as a basic measure of economic progress.

In the long term, raising the standard of living of all the world's people will require major breakthroughs in productivity. In the short term, the erosion of inflation makes substantial increases in productivity necessary to help maintain the standards that have already been achieved.

These needed increases in productivity will come not only from working harder, but from working "smarter". Only through improved management of our resources—human, natural and financial—will we be able to maintain and improve our quality of life.

Of all the "engines" that have been developed to help us with our work, few possess the computer's potential for contributing to productivity.

Today, computers are helping design engineers test concepts without building expensive prototypes. They are helping farmers raise more abundant crops by providing information on the best land use patterns.

They are helping manufacturers increase production yields and improve product quality while conserving raw materials and energy. They are helping hospitals improve medical care by relieving doctors and nurses of many administrative duties. And they are doing much, much more.

A principal reason for this growing usefulness is the increased productivity of computers themselves. In 1952 it cost $1.26 to do 100,000 multiplications on an IBM computer. Today they can be done for a penny on a modern large-scale computer system.

A dozen years ago the least expensive IBM computers were beyond the financial reach of many smaller firms. Now models with comparable capacity are available for a fraction of the cost.

At the same time as per-function costs have decreased, major strides have been made in applying computers to new kinds of jobs and in simplifying their operation. Today thousands of IBM computers, large and small, are at work helping small companies to compete, helping large firms run more efficiently, helping make the economy more productive at all levels.

For us at IBM, the challenge of productivity is plain. It lies in continuing to help increase the productivity of the computer. The rest will follow.

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plied to living organisms, we shall have entered the era of genetic engineering.

HEART DISEASE. At the University of Giessen Medical School in Germany, Dieter Platt has been studying the molecular changes in artery walls, which allow atherosclerotic plaques to be formed—in the hope, of course, of interfering so that they *can't* be formed. Antonio M. Gotto, Jr., at the Baylor College of Medicine, in Houston, takes another approach: He is investigating the mechanism by which cholesterol molecules attach themselves to artery walls—again, with a view to preventing them from doing so.

Shifting to another area of research, one problem in heart attacks is that the damage done cannot be repaired. Some of the body's cells, such as the skin cells, go on dividing throughout life. Others, including liver cells, can start dividing again when damaged, thus regenerating the lost areas. But heart-muscle cells are among those cells that do not have this capacity. What makes cells divide or not divide? There are molecules—probably proteins—that can inhibit or dis-inhibit the action of genes; they act as on/off switches, so that cells know genetically when to divide and when to stop dividing. Can heart-muscle cells learn to turn on again—as liver cells do—and thus regenerate the damaged areas? Some scientists—among them Donald Fischman at the University of Chicago and Frederick Kasten at the Louisiana State University Medical School in New Orleans—believe so. They are already having some preliminary success in getting heart-muscle cells to divide again in tissue cultures.

If investigators like Platt and Gotto are successful, it might effectively prevent atherosclerosis, which is one of the principal causes of most kinds of heart disease. And if Fischman and Kasten are lucky, it means we all share their luck, because we might hope that the damage done in heart attacks can be repaired by the heart itself.

Thus, much open-heart surgery, cardiac-intensive care, transplantation, and other therapies would become rare occurrences if not altogether obsolete.

CANCER. Cell division is a central issue here, too—more so than in heart disease. In a cancer cell something has gone wrong with the "off" switch so that the cell doesn't know when to stop dividing. Thus it multiplies into the malignant tumors we know and fear. If we could learn the nature of the switch-off molecules, this knowledge alone might go a long way toward solving the cancer problem. There are many intermediate therapies—such as the one being looked into by Creed Abell. And as we better understand viral types of cancer, we may well come up with some specific anti-cancer vaccines. Jesse Charney of the Institute for Medical Research in Camden, N.J., for example, has developed a breast-cancer vaccine for mice and has high hopes that the same might be achieved to prevent breast cancer in women.

AGING. Many gerontologists are now convinced that the aging process is controlled by a genetically programmed "clock of aging" that dictates the running down of the DNA-RNA-protein chain, thus causing cells to deteriorate or die. They hope, by deciphering the process—and interfering with it—to eliminate most of the degenerative diseases associated with aging, perhaps to abolish "old age" itself, and even to extend the life span by a significant number of vigorous years. The most hopeful single event here may be the establishment within NIH of a new National Institute on Aging, just now in process of formation, which will presumably accelerate research toward these ends.

Even these grandiose projections only begin to suggest what we might legitimately hope for—not only in the relief of our aches and illnesses but also in the enhancement of our positive health and well-being. The mighty molecule, like a landlord's master key, may swing open for us the doors of knowledge, revealing answers for which we have not yet even imagined the questions. □

"I understand inflation is your department. Congratulations!"

Answer to *Literary Crypt No. 23* (see page 36): A deaf woman would be displeased at your shouting if she were conscious of it. Stendhal

Answer to *Wit Twister* (see page 48): trams, marts, smart.

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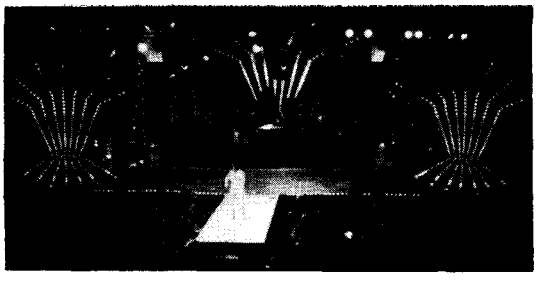

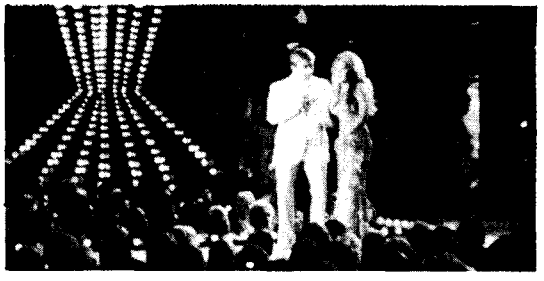

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** SOURCE:
NSI Report on Syndicated Programs 4 week period ending November 21, 1973, and 4 week period ending May 29, 1974.
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Strategies for the Future

Shifting away from violence, hunger, and from economic instability is part of a plan that also calls for greenhouse agriculture and space farms.

Environmental Structures, Inc.

Inflated Plastic Greenhouse—*"We see no other practical alternative for avoiding severe environmental disruption."*

by Theodore Taylor

Some of man's most exciting and hopeful options for the immediate future hinge on a daring concept: the taming of outer space to meet the needs of mankind. If the groups working along these lines are right in their surmise, we can look to space and as well to earth itself for new pollution-free living environments and for new sources of minerals and energy so vast that they can open up an era of plenty for all.

Prominent among these space-oriented planning groups is the Washington-based Committee for the Future, whose major project is the "Choiceful Future" program. The project's goal is to increase the diversity of available choices for developing the full potential of all individuals and societies. Its short-range objective is to formulate and widely publish, by January 1976, a strategy for international actions to shift human developments toward this goal and away from the present trends toward more violence, hunger, economic instability, irreversible damage to the earth's biosphere, and authoritarian control of individuals and societies.

These actions will consist of the planting and nurturing of "Seeds of Hope," which are specific human enterprises designed to contribute, individually and collectively, to achieving the goal of a more choiceful future for all. These "seeds" are also to be selected for suitability for rapid growth and propagation of similar enterprises that work in a variety of types of cultural, economic, biological, and physical environments in the cores of cities, new communities, tropical jungles, deserts, and on the surface of the moon and the voids of space.

The Choiceful Future project formally started at a weekend conference last July at Greystone Mansion, the Washington, D.C., headquarters of the Committee for the Future. The purpose of the conference was to define a set of specific goals for human development on earth and in space. Besides the founders of the Committee for the Future, Barbara Marx Hubbard and John Whiteside, participants in the conference included about 30 members and active colleagues of the committee.

The preliminary conclusions were the following:

- Continuation of recent trends in human activity through the end of the twentieth century are likely to cause the quality of life of most humans to deteriorate rapidly as economic, political, and ecological instabilities approach overwhelming proportions.
- Both the environmental impact of expanding technology and rapid growth of the human population contribute strongly to this deterioration in the human prospect.
- Among the large array of opportunities for shifting these trends is one that is almost totally ignored by most of the present generation of prophets of doom—the possibility for large-scale extension into space of human technology and habitats.
- It is now possible to visualize, in some detail, new lines of human development on earth and in space that, by the year 2000, could shift the human pros-

Theodore Taylor, chairman of the board of the International Research and Technology Corporation, worked at Los Alamos from 1949 until 1956. He is the co-author of Nuclear Theft: Risks and Safeguards.

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pect toward one full of hope, rather than despair.

• The Committee for the Future should undertake to develop the elements of a worldwide strategy to respond to these opportunities, for worldwide dissemination to the public in 1976.

A tentative list of these new opportunities was drawn up at the conference, along with a preliminary schedule for major milestones. The objectives, proposed content, and schedule of the project were further refined at a second Greystone conference in September.

The tasks that the Choiceful Future project intends to carry out during the next year are the following:

First, identify and assess a number of possible lines of human development for dealing with regional and worldwide problems, with emphasis on hunger, economic instability, energy shortages, environmental degradation, depletion of natural resources, threats of increased violence, and the deterioration of cities. These will include not only actions on earth but also possible new enterprises in space that show promise of major improvements in the quality of life of people on earth and of those people who may be living and working on the moon and in space.

Second, the lines of development that appear to be especially promising will be developed into a self-consistent strategy for international development through the year 2000. This will contain specific milestones, to be reached by dates that are responsive to the urgency for alleviating each of the major classes of problems. As this strategy is developed, the important interactions between the different components of the strategy and the problems they are designed to solve will be systematically analyzed, to assure that the overall result of implementing the strategy will be desirable from a variety of human points of view. Two key tools will be used for this purpose: extensions of present computer models to an "earth/space impact model" for determining the economic and environmental impact of each major line of development, and a process, called Syncon, that has been developed by the Committee for the Future, for involving both experts and the general public in organized discussions of important issues. Plans are being made for a "global" Syncon, in mid-1975, to review and modify the strategy as it has been formulated by that time.

Third, the results of the project effort will be widely disseminated early in 1976, in a book for the general public, a set of technical reports, and audio and video tapes suitable for use by broadcasting networks.

Here, very briefly, are some of the "Seeds of Hope" now in the inventory of the Choiceful Future project:

For Planting of the "Seeds" on Earth

• Controlled environment greenhouses for growing most of the world's food crops. The committee sees no other practical alternative for avoiding the severe environmental disruption caused by the release of excess fertilizers and pesticides required for intensive open-field agriculture. The economics of greenhouse cultivation of grains, the world's present main source of food, may be favorable if done on a very large scale, and if full account is taken of its other advantages—relative independence of local weather, low water consumption, high yields per unit of land area, and suitability for cultivation near centers of distribution for local food consumption. Preliminary estimates suggest that grains, fruits, and vegetables sufficient for providing a balanced diet for more than 200 people from each hectare of greenhouse structures can be realized at initial capital costs as low as $50 per consumer. Greenhouse systems can be either capital or labor intensive, depending on local conditions. The basic technology of this type of cultivation, applied to lettuce, tomatoes, and other relatively high-value food crops, is now being used in many parts of the world—especially in Western Europe, but also in Japan, Abu Dhabi, the Soviet Union, and the United States. Practical extension of this technology to the growing of wheat, rice, and other grains looks difficult, but it may be very much worth trying.

• Relatively self-sufficient communities that make full use of locally available sources of energy and materials. These communities are designed to provide their residents with a sense of full participation in the economic, cultural, and political development of the community, while they also provide easy access to natural environments that are little disturbed by human activity. An example is Paolo Soleri's Arcosanti community, which is now being constructed in Arizona.

• Industrial enterprises in which all potentially polluting waste materials and used products are recycled or compacted and stored without significant degradation of the environment.

• Efficient urban, interurban, and rural systems for individual and mass transportation that are propelled by engines driven by non-polluting sources of electricity or clean fuels, such as hydrogen, methane, or pure carbon.

• Central-station power plants for generating electricity, high-temperature process heat, and useful forms of low-temperature heat, supported by fuel cycles that are "closed," in the sense that none of the materials flowing through them are allowed to pollute the environment or, in the case of nuclear fuel cycles, are accessible to people who want to use them for destructive purposes.

Almost totally ignored by most of the present generation of prophets of doom is the possibility for extension into space of human technology and habitats.

For Planting in Space

• Large satellites, both manned and unmanned, in orbits around the earth, for providing information and fabricated products for direct use for human enterprises on earth. Present costs of launching satellites into orbits close to the earth are roughly $1,000 per pound. This means that only goods or services that have an extraordinarily high value per unit weight placed in orbit will be suitable for orbital enterprises until lower-cost earth-orbit transportation systems are developed. But even at present costs the opportunities for using satellites to improve the earth's systems for communications, navigation and sea-traffic control, weather monitoring and forecasting, and surveys of natural resources extend far beyond their present applications. It is also likely to be possible within a few years to produce important, high-value products, such as transistors or ultra-high-strength fibers, in manufacturing facilities that involve full use of the low-cost solar energy, state of weightlessness, and the high vacuum available in orbit.

No fundamental reason exists why the costs of transporting people and cargo into and back from earth orbits should not eventually become as low as, or lower than, the present costs of inter-

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continental transportation by aircraft. The energy required for efficient engines to place an object in orbit is roughly the same as the energy used to fly it across the United States by jet. Present costs of transportation to and from orbit are nearly 1,000 times higher than long-distance air-transport costs because they are roughly equivalent to using jets to carry freight several thousand miles, making one flight every few weeks, throwing away the aircraft after each flight, and writing off the entire construction and operation costs of several big airports after a few flights.

• A "New World Seed," a lunar facility for extracting and processing materials and products for export to the earth. It takes less energy to transport cargo from the surface of the moon to the surface of the earth than to carry the same weight, by truck, from New York to Chicago. Analyses of samples of lunar rocks and soil collected by the Apollo astronauts tell us that the moon is a potential source of most of the raw materials used by industry on earth. Oxygen, silicon, aluminum, iron, calcium, magnesium, and titanium are all there in high concentrations. Development of very large-scale, solar-powered industrial facilities on the moon could provide a major relief from the environmental disruption of energy-intensive mining and material-processing industries now on earth. It is also quite possible that the total costs of most manufactured products will become lower than they are today if they are made from lunar materials and either directly exported to the earth from the moon, or further processed and manufactured in industrial facilities in space between the earth and the moon before shipment to the earth.

The estimate is that the total cost of planting a 5,000-ton industrial "seed" on the moon's surface within about 10 years of a decision to do so would be about $30 billion, roughly the total cost of the Apollo project. This facility could be used to demonstrate the practicality of mining the moon and exporting high-value products to the earth. It would also sustain a population of about 200 people on the lunar surface without further support from the earth. Among the possible products are high-strength titanium alloys and pure silicon crystals for use in solar-energy conversion systems on earth. It is possible that the total value of exported products would be more than $5 billion per year.

• Facilities on the lunar surface and in space that not only can manufacture products for export but also are able to manufacture most of the components of additional processing, manufacturing, and life-support facilities, using only lunar materials and solar energy as inputs. It takes about 20 times as much energy to propel an object to escape velocity from the earth's surface as it does to escape from the moon's surface. This means that human activities in space will be severely limited until machines capable of making *other* machines can operate in space without having to use large quantities of materials supplied from the earth. At the Institute for Advanced Study in Princeton in the late Forties, the mathematician John von Neumann worked out the logical theory of what he called "self-producing automata." More recently, Freeman Dyson, at the same institute, has further developed some of von Neumann's ideas as they might apply to very large enterprises in space. A key task facing the Chocefful Future project will be to conceive and describe such machines in some detail, to determine, among other things, what additional weight must be accounted for in various types of mining and manufacturing facilities for them to be able to manufacture most of the mass of additional facilities, using only lunar materials and solar energy to do so.

• Earth-like habitats for large-scale community-building in space. Prof. Gerard K. O'Neill, a physicist at Princeton University, has recently worked out the basic engineering concepts required for constructing artificial human habitats in space, using solar energy and lunar materials propelled to them from the moon's surface. His "Model I" of such an artificial world would be about the size of a supertanker and capable of supporting a population of 10,000 people in comfortable and pleasant surroundings. He has estimated that "Model I," which would have a total mass of about 500,000 tons (mostly coming from the lunar surface), would take about 10 years to build and would cost about $30 billion. This sum includes the cost of building and placement on the moon of a machine that could collect lunar soil and propel it, with an electromagnetic accelerator, to the orbit of "Model I" around the so-called L-5 libration point, which maintains approximately a fixed position in space relative to the earth and the moon. "Model I" is proposed by O'Neill as a relatively small prototype of much larger, subsequent habitats that would be, as he puts it, "far more comfortable, productive, and attractive than is much of earth." Whether sufficiently large numbers of people may choose to emigrate from the earth to such worlds as to have a major effect on the size of the earth's population is uncertain; however, it now looks as though it might be a real possibility within the next 50 to 75 years. In order for this to be technically and economically practical, however, it is clear that machines will have to be built that are capable of at least approximate self-replication from materials available from the moon, asteroids, or other relatively low-gravity objects in the solar system.

These "seed worlds" will enhance the opportunity for pluralism and a multiplicity of life-styles. Choices that will become more restricted on a finite and crowded planet can be tested in the extended environment of space—where "astroculture," for example, will complement agriculture to help provide a continuing material base for the devel-

"He throws away his best work."

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opment of humanity. The requirements for cooperative action in these new worlds in space may provide models for improving our performance and cooperation on earth. The severity of the environmental challenges draws forth such basic virtues as honesty, sharing, self-discipline, concern for the whole. "Selfish" behavior will more obviously endanger the survival of the group, whereas cooperative behavior will be more readily visible and appreciated. Humanity has received many ethical instructions from all its spiritual leaders –yet we have consistently failed to live up to our own expectations. Possibly the challenges of extraterrestrial living will create the model of brother-sister-like behavior that we have longed to achieve on earth.

These efforts to build new worlds on earth and in space will require international cooperation that may provide the stimulus needed for overcoming aggressive tendencies that threaten to become suicidal. The sense of oneness that crystallized when we saw the first pictures of our earth from space will be nurtured by our working together on this earth and beyond this earth to provide a broadening future for all. The benign, non-polluting stimulus to economies, the life-oriented technological innovations, the involvement of people now excluded from "the system," and the opportunities for self-fulfilling employment–all of which characterize these new efforts–may prove to be the only ways of avoiding impending catastrophies with the earth's overburdened biosphere.

The Committee for the Future believes new options such as these *must be explored as collective insurance for the human race.* At the Washington headquarters, called the New Worlds Center, people from all over the globe gather to cross-fertilize ideas and to plan common actions to achieve a desirable future. It might be called an "evolutionary launching ground"–comparable to the pubs and cafés where people gathered to talk of freedom in the seventeenth century. What freedom was to that age, holistic futurism may become to ours. The question is, How many people are ready to act, to rally resources, and to work together for a choiceful future for all? The Committee for the Future believes such people are in the majority. It invites communication from readers who would like to participate in this effort. □

Your gift can go a long way this Christmas.

On the back roads of Mississippi, Alabama and other parts of the deep South, there are still many thousands of families facing slow starvation. Right now. Right here in the U.S.A.

Their diets are so inadequate that hunger and malnutrition have become part of their lives. Many children of tenant farmers and seasonal workers have actually never known what it is like *not* to be hungry.

The NAACP Emergency Relief Fund is now in its fourth year of collecting money to buy Food Stamps for the neediest of these families. Under the federally sponsored Food Stamp Plan, $1 buys as much as $40 or more in Food Stamps. Thus your $10—an amount that buys "just another Christmas gift" for more fortunate kids—can mean $400 worth of urgently needed nourishment to help a family survive.

To contribute to this fund, please send as little or as much as you can to the NAACP Emergency Relief Fund. Contributions are tax-deductible.

Thank you. And may your Christmas dinner be a little more enjoyable this year.

NAACP Emergency Relief Fund
Dept. B4, Box 121, Radio City Sta.
New York, N.Y. 10019

A project of the NAACP Special Contribution Fund—tax deductible arm of the National Association for the Advancement of Colored People.

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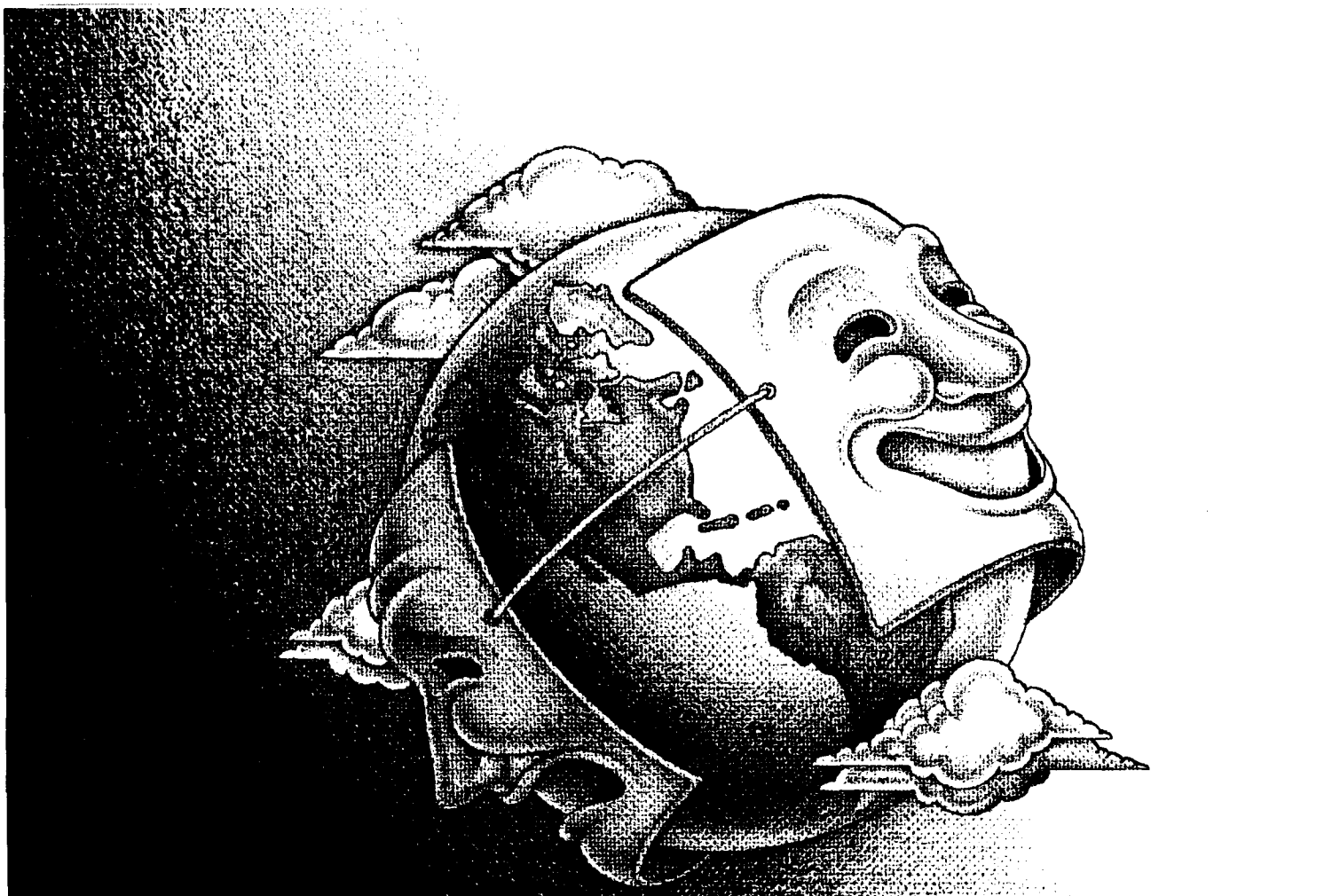

Every insurance company looks ahead to the future. Prudential looks forward to it.

The future can be viewed from two different perspectives. We at Prudential have good reasons to favor the bright side.

We are in the business of predicting the future, utilizing actuarial tables, statistical projections, computer analyses, and directional charts of current trends.

These tools help us point to a healthier, happier, better educated, longer lived America. One which, if it is beset by problems, is also uniquely able to cope with and solve those problems. Problem-solving is the American way of life.

We also see that the American people basically agree with our optimistic outlook. For sales of life insurance are increasing steadily. To us that means more and more people are confident of the future.

Indeed, it is the basic confidence of the American people upon which we rely.

Prudential

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Toward a Restoration of Confidence

How heads of state and leaders from different fields, polled by the editors of Saturday Review/World, assess the prospects for an upturn in human affairs.

The editors have asked leaders, many of them from economic and political sectors, whether they felt a depression could be averted and whether they felt optimistic about the ability of human beings to meet the principal problems confronting them. The following pages consist of responses to those questions, as well as—in the case of some world leaders—extracts from recent writings and public statements. We regret that a number of replies came too late to be included in this issue.

Coretta King

Lecturer and Author, *My Life With Martin Luther King, Jr.*

Although there is no argument that the problems of our times are awesome and easily evoke images of the apocalypse, what is generally overlooked is the fact that the fundamental solutions have been discovered. We are not faced for the most part with mysteries of science or technology a millennium away. The unspeakable conditions of famine, for example, are made harder to face because there is little doubt in the minds of any of the experts that the world has sufficient arable land to raise enough food to feed everyone. The age-old problem of war is certainly not beyond solution if the will exists to apply remedies. Indeed, we may be on the threshold of the abandonment of world war already. Similarly, dwindling resources are quite relative. They cease to dwindle as new discoveries are made. Human intelligence is equal to the problems of our times.

Intellectual conceptions of solutions do not, of themselves, organize the remedies. Clearly, if enough food can be raised to feed people, and yet hundreds of millions starve, it is the form of organization, of distribution, and concepts of ownership that keep the hungry from the plenty. We have managed to evolve from feudalism to capitalism because feudalism was too inefficient, too inequitable to meet human needs of its times. Adam Smith's capitalism gave way to Keynesian capitalism for the same reason. We are now standing on the threshold of a new change of institutions that will modify our old concepts of ownership and distribution. We know our task is to encourage the change and keep it democratic and civilized.

I regard myself as basically hopeful about the human future because humankind has always, individually and collectively, fought vigorously for survival. We possess a large store of knowledge and substantial technology along with more widespread enlightenment than the human race has ever known before. In saying this, I do not suggest that all transitional experiences will be tranquil or without cost. There will be many sacrifices, unfortunate defeats of sound policy, periods of retrogression, but over the long view, I see a triumphant human experience.

HAROLD WILSON, Prime Minister of Great Britain

Britain's future and the world's cannot be separated. I believe that the international community has the power and the wisdom to ensure that the world economies do not enter into a major recession. That is the precondition for Britain's success. But we are already making good progress toward putting our economy in order. Price increases have been moderating; the balance-of-payments deficit is narrowing; unemployment has not shown the dramatic increase forecast. We also have a stable majority government able to plan ahead. I am an optimist.

Marya Mannes

Journalist and Author, *Last Rights*

It may be that catastrophe is the midwife of hope. The purge must be great for the purification that follows. We have birthed monsters in our time (as in others), political, social, economic, human, although the order should be reversed, because the human mind has created the rest. Yet I must believe in the renewal of hope as I believe in the creation of a new human order: a state of being where compassion transcends competition and the killing of others is the killing of self.

It will be a long and painful birth. But when the head first emerges, breathes, and cries, hope is born.

I include the following in my Inventory of Hope:

- The total partnership of men and women in terms of leadership in government and society as well as in the home.
- The awareness on the part of the young of the degree of rapacity and deception in many areas of business, government, and labor—and their refusal to connive in these acts.
- The recognition of valid relationships outside of as well as in marriage and that in neither case is gender a matter of public concern.
- The recognition that women have the option to bear or not to bear, and that children are neither a prerogative nor a solution.
- Acceptance of the fact that the unwanted child—not its abortion—is the crime.
- Awareness that war hurts the aggressor as much as the aggressed, and that the innocent suffer most.
- Awareness (long delayed) that a society based on advertising and selling goods is actually selling people into the bondage of material greed which has brought us to the present crisis.
- The hope that this crisis will bring truth, perception, and fortitude to our

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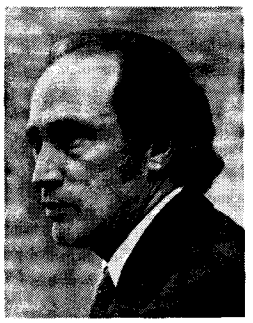
PIERRE ELLIOTT TRUDEAU, Prime Minister of Canada



I am often asked these days if I see any basis for hope in the world. I sense that it is a question edged at times with fear, with a foreboding that it is already too late and that we are the helpless victims of an impending catastrophe. Even the most optimistic among us have faced moments of such doubt. But this question and the motives for it serve to prod us to define the nature of the forces that militate against us. We are challenged to turn from a blind, facile, and false optimism or an irresponsible hedonism to a more wholehearted employment of our energies, our minds, our skills and talents.

We have today ample evidence that men and women of conscience and compassion from all disciplines are involved in a massive and minute reassessment of their lives, beginning first with themselves and extending to the limits of their imagination. This challenge, which has been taken up throughout history by prophets, reformers, saints, and philosophers, appears to me today to be a contagion of concern and goodwill. The sense of our interdependence, the disappearance of many of the boundaries that have separated and isolated us, the recognition of the intricate balance that exists in all things, have brought us to a new awareness of our need to heed and to trust one another.

The challenge today is multi-pronged and is being met in a variety of imaginative and encouraging ways. The most recent energy crisis has brought to light a diversity of attitudes and a multiplicity of directions—all of which contain the seeds of hope and the value of counterbalancing influences. There are, first, those who have believed and continue to believe in the myth of progress, whose faith in science and technology is almost akin to a faith in magic, and who are expectant that at any moment some hitherto-unknown solution will burst upon us. This is based upon our experience that the most random and unexpected insights and directions have come to us throughout history. Today, a new and hopeful dimension of moral responsibility has entered the sphere of scientific concern. It finds expression in an international consciousness of scientific responsibility and in such ventures, for example, as that of creating a permanent forum for men and women of science and the arts discussed at the recent conference at the Sorbonne on biology and the development of mankind. A morality based on sharing finds expression in the Law of the Seas Conference.

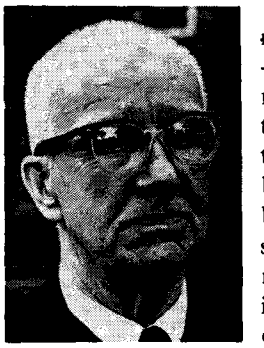
Secondly, there are among us in the private sector those who are actively involved in alternatives to our heavily resource-demanding technologies. The political process is increasingly attentive to and responsive to this voice. Although few in number, these groups, such as the new alchemists headed by the Canadian John Todd, are experimenting with solar heating, wind-generated electricity, fish farming, and a variety of other ecologically focused solutions. The conviction and vision of much of the back-to-the-land movement can be seen as a positive direction toward healthful, wholesome living, to a concern with community and a visible and felt cooperativeness, toward realizing and strengthening the bonds among ourselves and directly between us and nature, toward stewardship of the earth rather than exploitation, trusteeship rather than ownership. Walking in the tradition of Thoreau, they have chosen to stop watching the specter of doomsday.

Still a third response is exemplified by a concern with understanding the inner being. The increasing number of young people and their solutions are born within us. The search for a new consciousness and the disenchantment with a purely materialistic and acquisitive ethic is no longer the sphere solely of the individual mystic.

These and many other signs indicate that we do not hope in vain. In our desire to see the true nature of the situation, we must view each problem, each tragedy, each indication of helplessness, resignation, and cynicism against the light of the patience, the integrity, the courage, and the compassion that have also defined our race. By this light, we are enabled to see beyond the shadows of the very real inequities and injustices that mar the world to a more tolerant, more beautiful reality that it is granted to us to create.

society by exposing the roots and reasons for our condition.

R. Buckminster Fuller
Inventor-Discoverer,
Geodesic Structures



During the next 25 years—the curtain-raising of the twenty-first century—the number of biased blunders, short-sighted misjudgments, and opinionated self-deceits will total, at minimum, 600 million errors.

This is not to say that man is stupidly ignorant; it is to say that in the design of universal evolution, man was given an enormous safety factor within which to learn, by trial and error, to dare to use his intellectual conceptioning to advance into the future.

Today, that trial-and-error sustaining nutriment is beginning to be exhausted. Eventually, either humanity will cease to live aboard this sun-orbiting spaceship, *Earth,* or it will realize that it can indeed do anything it needs to—and cannot afford to do anything else.

The responsibility for man's interim-survival success on Spaceship *Earth* does not fall directly within the capabilities of political theory or with the results obtainable by politics' ultimately greatest lever—war—hot, subversive, cool, or cold. It falls instead to the gradually increasing use of man's intuition and intellect.

The present urgency of man's problems poses quite a challenge to that intellect. But only under the stresses of total social emergencies thus far demonstrated by man do the effectively adequate alternative technical strategies synergetically emerge. Here we witness mind over matter: Man is unique among all living phenomena as the most adaptable omni-environment, exploring, and operating organism.

So, planners, architects, and engineers, take the initiative. Go to work, and above all don't try to gain at the expense of another. Any success in such lopsidedness will be short-lived. These are the synergetic rules that evolution is employing. And they will give us the flight-controlling capabilities in bringing all of humanity in for a happy landing. *(Continued on page 65.)*

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The energy mine. Every community has one.

The millions of tons of garbage produced by America's cities could create enough energy to help light every home and office in the country. Hard to believe? Listen:

- Right now, St. Louis gets some of its electric power from a plant that can burn 300 tons of processed garbage daily.
- In Chicago, a Commonwealth Edison plant is being modified to burn processed garbage. Expected output: enough power to light a city of 40,000.
- In Nashville, a new plant burning 720 tons of garbage per day will provide heating and cooling for 27 public and private buildings, including the State Capitol. The State alone will save an estimated $165,000 a year on space conditioning its buildings.
- Connecticut has adopted a statewide plan to construct resource recovery plants, one a year from 1975 to 1985. These plants will supply 11% of the state's total electricity needs.
- Other major energy recovery projects are planned for New York City, Boston, Cleveland, Milwaukee, Memphis, the New Jersey Meadowlands, Dade County in Florida and Orange County, California.

As a major producer of packaging, we are as concerned with the disposal of our products as we are with their use. That's why, like a number of other companies, American Can has developed a process that makes once useless municipal waste a new source of energy. It also produces marketable steel, aluminum, paper and glass.

We call it the Americology™ process and it could help your community open its own energy mine. For an Americology brochure, write: Americology, American Can Company, American Lane, Greenwich, CT 06830.

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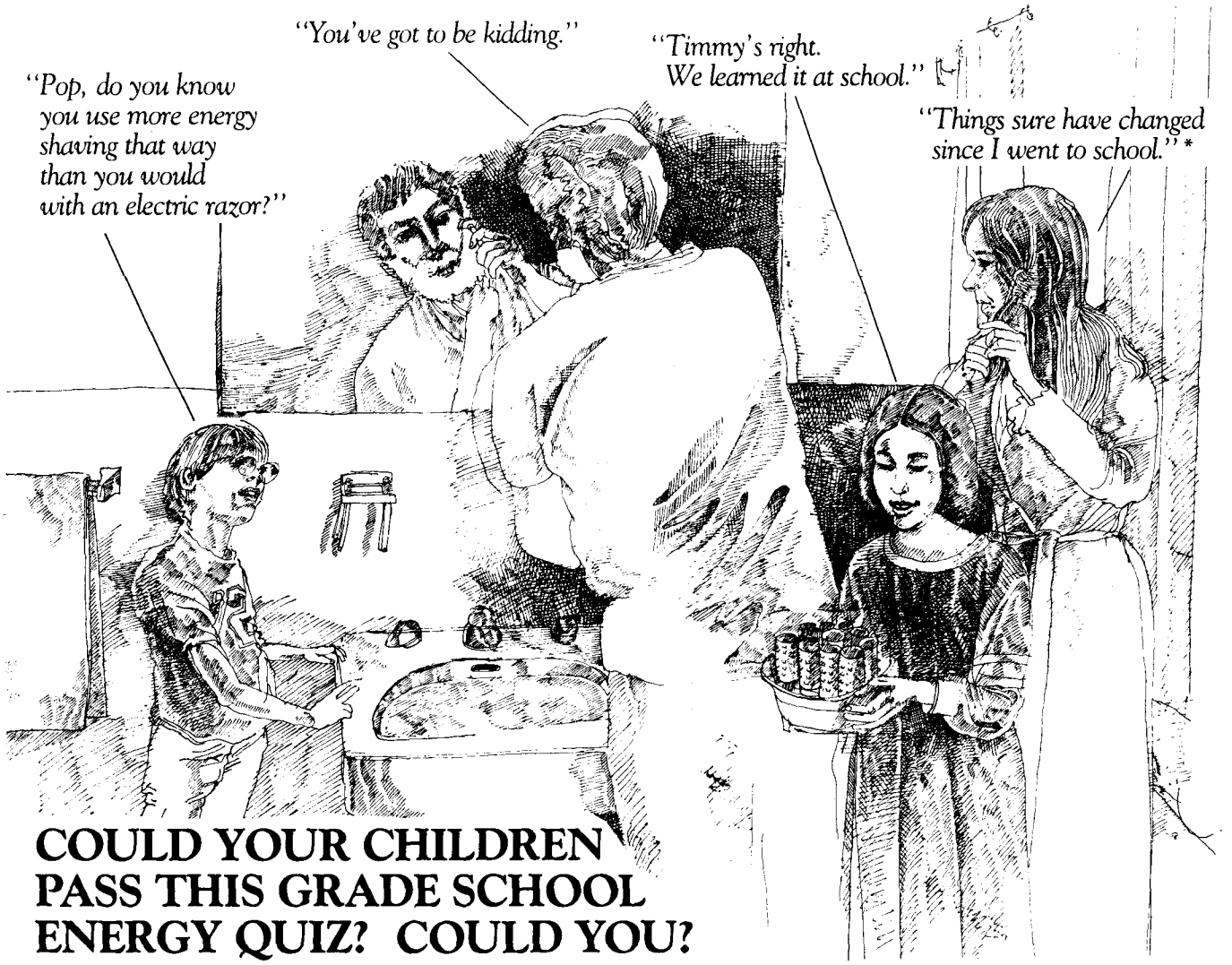
"You've got to be kidding."
"Timmy's right. We learned it at school."
"Pop, do you know you use more energy shaving that way than you would with an electric razor?"
"Things sure have changed since I went to school." *

COULD YOUR CHILDREN PASS THIS GRADE SCHOOL ENERGY QUIZ? COULD YOU?

1. The average American uses ☐2 ☐4 ☐8 times as much energy as the average person in the rest of the world.

2. Which gives you more light from the same amount of energy: ☐one 75-watt bulb ☐three 25-watt bulbs?

3. The most abundant energy resource in this country is ☐natural gas ☐coal ☐oil.

4. Most gasoline in the U.S. is consumed on car trips of ☐under 5 miles ☐5 to 10 miles ☐over 10 miles.

Chances are, when you were in school, nobody asked questions like these. Because nobody thought the answers were important.

But children today are facing an increasingly energy-conscious, environment-conscious way of life. They must have the answers. And the sooner the better.

One promising approach to energy education is a pilot program for elementary and secondary school students developed by the Bolton Institute of Washington, D.C. The idea is to get youngsters involved in energy-saving activities at home and through community workshops. It is being tested now in the New England states.

But there's much more to be done. Energy education needs the support of all of us to really take hold. That means community leaders, business people, teachers–and parents.

We're offering two booklets we think you and your children will find stimulating and fun: "Energy Conservation Experiments You Can Do", published by the Thomas Alva Edison Foundation; and "The Energy Challenge: What Can We Do?", published by Energy Conservation Research. For copies, write Conoco, Dept. C53, GPO Box 29, New York, New York 10001. And if you'd like to know more about the Bolton program and how it might be applied to your community, write directly to the Bolton Institute, 1835 K Street N.W., Washington, D.C. 20006.

Answers to quiz:
1. 8 times. **2.** One 75-watt bulb. **3.** Coal. **4.** Under 5 miles.

*We're not trying to tell you how to shave—we'd hope nobody would. We just thought you'd like the facts to choose for yourself.

Continental Oil Company conoco

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Mary Lasker
Member, Executive Committee,
American Cancer Society

If we will apply our intelligence, talent, and resources, we can find the answers we need.

We can certainly solve the *overpopulation* problem if we exercise the will and discipline and supply the funds to do so.

In the field of prolongation of the prime of life and survival, it is generally considered by knowledgeable research workers in the field that the riddle of cancer can be solved. It is in the process of being solved now.

But *cancer* is a group of many types of tumors. Some are being successfully treated with drugs now in varying degrees. With adequate support, much more successful treatments will be developed in the next five years with drugs and immunotherapy. In 10 years, with adequate funds, this group of diseases should be under much more control because it will be treated in new ways and possibly through vaccines. In 1973 cancer deaths totaled an estimated 353,000.

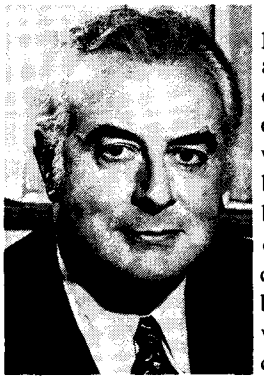
One of the main causes of stroke, *high blood pressure*, can now be controlled, but only about 12 percent of the 23 million people who have it are being suitably treated. This is a public-health problem that, left untreated, causes great economic and human losses. Additional state and federal funds for screening and treatment programs, as well as efforts by large employers, could reduce deaths from stroke through the proper treatment of high blood pressure.

Cerebrovascular (stroke) deaths in 1973 totaled 215,000; heart deaths, 754,000. High blood pressure is estimated to be a factor in at least 68 percent of first heart attacks each year and in 75 percent of first strokes.

In general, what is really lacking at the present time is leadership, and I am hoping that new leaders will evolve in many fields.

I am basically optimistic about the future of human beings. Mass education in developing countries and the gradual elimination of poverty probably won't take place on a worldwide scale until the twenty-first century. Much could occur before then, but I feel that the solutions to some of the problems will take longer.

E. GOUGH WHITLAM, Prime Minister of Australia



Bertrand Russell once described himself as a cheerful pessimist, and if I may adapt the phrase of so illustrious a man, I should call myself a sanguine optimist. It is not difficult to be optimistic about Australia. With her moderately small population, basically sound economy, and vast natural resources, her prospects are considerably brighter than average, though there is a danger that these blessings combined with isolation may make her heedless of other nations' misfortunes. We must resist that tendency not simply because of grounds of morality but also because the survival of humanity and civilized democracy will require from all nations an unprecedented measure of international cooperation. The opportunity for such cooperation exists in the United Nations. There is as yet no substitute for it, and there is a good chance that the organization will survive as a workable and practical forum.

I base my hopes on three things. I base them on science or on the scientific method, which is our ultimate defense against dogma and mysticism. I base them on the idealism of youth of a generation that has already rejected war and that displays a greater capacity for love and human tolerance than has any before it. And I base them on man's instinctive common sense and will to survive, which has carried him through crises in the past and will do so again.

Edward R. Kane
President, E. I. DuPont
de Nemours & Co., Inc.

Point 1. My optimism rests on a rational, rather than an emotional, base. It takes into account what has already happened in our history, brief though it is. That history speaks well for the innovativeness of the American people in facing up to challenges.

Point 2. I do not believe that a full-blown depression is imminent. The structural strengths and internal balances of our economy should prevent one. A new spirit of national cooperation among business, labor, and government is well within our means and is as important as any single remedy in fighting inflation.

We must recognize the obvious: the need to restore confidence in the dollar, increase production and productivity, expand job-creating investment capital, limit costs and prices. And we must take care of the first inflation casualties, such as those on fixed and low incomes. In moving toward solutions, I hope that our leadership lays the facts on the line and summons the total American population to the hard things that have to be done.

Point 3. Innovation is related to creativity. Historical importance must be attached to nurturing and safeguarding the conditions of creativity.

Point 4. The nation's oil and gas problem results from rising consumption, waste, and fragmented government policies that on occasion have run counter to the economic realities and have lacked flexibility. We have no alternative but to mount a vigorous and sustained conservation program. Then we must bring our domestic energy-supply capability to levels where importation costs and risks are acceptable. This means that the encouragement of maximum domestic oil and gas prices—at least from new wells—should be delayed no longer. Maximum effort must be given to development and utilization of our other fossil-fuel resources, especially coal. In the long run, this country must commit itself to a sustained and well-balanced effort to explore and to develop the use of solar energy, nuclear fusion, and other sources of energy. It should be remembered that the chemical, textile, pharmaceutical, rubber, plastics, and other important industries depend on oil and gas not only for their energy content but also for their basic source of raw materials.

(Continued on page 66.)

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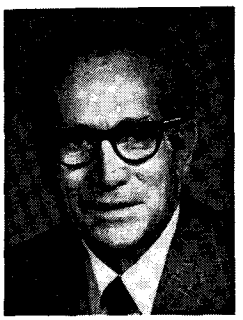
Automotive's Big Three

Thomas A. Murphy
Chairman of the Board,
General Motors Corporation



I don't have to think twice about the question, Do I consider myself an optimist? No one can be in the automobile business for very long unless he is an optimist. We've got to make large bets all the time—bets that the economy will justify our large investments and bets that people will confirm our judgments on what they may like or not like.

Mostly, though, I suppose that I am an optimist for historical reasons. The study of civilization, as Toynbee has emphasized, shows that the greatest changes were produced, not by technology, but by ideas. Certain ideas have created vast torrents of human energy—the most powerful form of energy on earth. These ideas haven't always been good for humanity, and the cause of civilization has suffered accordingly. But the main surge produced by ideas has been in the direction of an improved human condition and therefore of an evolving civilization.

So long as humans are capable of generating great ideas, I think the optimists have a good chance of being right.

As for the problems confronting us, I am prepared to admit that they are probably the most intricate and baffling assortment of difficulties which have yet confronted human intelligence. But those who predict disaster are talking beyond their knowledge. Their predictions would have force if they could be certain that the human mind would cease to function. But this is not the way history works.

I think we should respect the size of the problems that confront us. But I do not think that we should be overawed by them or terrified by them. Nor do I believe a depression is inevitable—although I don't minimize the fact that we can talk our way into a depression. Also, through government policies that promote fear and that produce a stagnation of the economy, we could trigger a depression. My point is that it doesn't have to be.

John J. Riccardo
President, Chrysler Corporation

My experience has been a sustained exposure to problems that require solutions. The automobile business is first and foremost a business that calls for solving complex problems. Not infrequently, we have no precedents to guide us. One must be optimistic if he expects to solve some of these problems.

Being an optimist, however, doesn't mean that I am uncritical of many things that are happening today. I am concerned that in our zeal to curb inflation, we could bring on even worse problems of high unemployment and recession. The entire automobile industry is already feeling the negative effects of decreasing demand, and this could soon spread to other industries. Inflation must be solved, but not at the expense of a serious economic downturn.

Why, then, am I optimistic? I am optimistic because the essentials are sound. Americans know how to produce. Production is the key to strength. Americans are attuned to creative and dynamic solutions. They know how to innovate. They know how to take big, new leaps—not just scientifically, but intellectually.

I have more than a reasonable degree of confidence that we can substantially improve our own society and help to do the same for the world. For example, when we help establish automotive industries in developing countries, we not only provide jobs and economic growth but also can help turn back the threat of famine by improving the distribution system. The extent to which the food crisis isn't exclusively a matter of availability but of distribution isn't generally appreciated. In some places in the world people are going hungry because they lack the basic transportation system to move available food to the people. Trucks and good highways can do the job.

The automobile industry has an excellent future in an expanding world market. We can solve our problems, and I welcome the challenge of taking part.

Lee A. Iacocca
President, Ford Motor Company

I am an optimist—about people, about the United States, about business, and about life in general.

Point 1. I do not believe that the United States is on the verge of a depression. However, I do believe that there are certain problems which must be dealt with quickly and effectively. Several measures must be taken:

(a) A gradual tightening of fiscal and monetary policy by the federal government to bring inflation down without throwing the economy into a recession. Federal expenditures in fiscal year 1975 should be cut substantially below $300 billion, and the budget for fiscal year 1976 should be in balance.

(b) I support President Ford's suggestion that every part of government include "inflation impact" statements in their legislative proposals and requests. I would also encourage the federal government to look at the "inflation impact" of legislation already on the books.

(c) Restraint in government legislation and regulation that increases costs to consumers and causes excessive demand for materials and energy. For example, about 10 percent of annual capital expenditures, or about $11 billion a year, is now going to meet environmental and safety standards for plants and products. None of these mandatory expenditures increase productivity or add the capacity needed to relieve shortages and to provide more jobs, and they displace investments needed to support growth.

In our industry, current and proposed new safety and emission standards for 1976, 1977, and 1978 model cars would add about $750 per car, or $8 billion a year, to consumer expenditures, if we could meet them all. These standards would also add about 2 million tons a year to the materials requirements of the automobile industry, would increase gasoline consumption of each new car, and would require more than $1 billion of fixed investment by Ford Motor Company alone. I believe that a five-year moratorium should be declared on new-vehicle standards beginning January 1,

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1975. During this period further safety and environmental gains can be made by standards already in effect, while at the same time, inflation can be checked by slowing price increases, by reducing excessive demand for materials and energy, and by releasing capital needed to expand capacity and productivity.

Point 2. An intangible but very real threat in the United States today is the growing uncertainty about the future. When people speculate about the worst thing that could befall them, at the top of the list they put not knowing what's going to happen to them.

Point 3. I am an optimist concerning the fuel problem, because I believe in the free-enterprise system. When the forces of supply and demand operate freely, prices rise during a shortage—as fuel prices did during the energy crisis. The higher price acts as an incentive for increased production of petroleum products and for more research and development programs for finding new oil reserves and alternate sources of energy.

James L. Ferguson
Chairman and President,
General Foods Corporation

I would not be surprised, or necessarily even disappointed, if the rest of my lifetime or the rest of my business career spanned a period when we would be digging out and seeking solutions, alignments, and institutions that are more in keeping with the present and the future. There will be a good bit of stumbling and expedient action.

The United States is not, in my view, on the verge of a real depression in the 1932 sense. There is indeed a crisis of confidence, but the overall underpinnings are still too strong. For example, unemployment is increasing, but there is still a record number of employed. Certainly we are in for a period of economic slowdown, possibly an extended one, accompanied by inflation at or near present levels. Somehow, though, that seems to oversimplify things. The wealth of the world is being drastically redistributed. The dislocations will be severe. If I have one serious worry, it is that the Arabs will not wake up in time. It is unnatural for a relatively small group of people to have such a hold on the rest of humanity. No nation or people has ever succeeded in acquiring the world, and I don't think the Arabs will succeed either.

As for new sources of energy, I doubt that major new sources can be found in time to preclude a need for significant quantities of Arab oil. This means that one way or another we are going to have to get it. Recent indications are that such exotic things as extraction from tar sands and shale are becoming more and more difficult and unattractive. The "down the road" prospects of solar energy and nuclear fusion seem to me to be the alternatives that have the greatest long-term potential and should be aggressively pursued. In the meantime, though, I think we are going to have to stick to traditional sources, for the most part.

VALÉRY GISCARD d'ESTAING, President of the French Republic

The world is unhappy. It is unhappy because it doesn't know where it is going and because it guesses that if it knew, it would discover that it was heading for disaster.

It is not a passing difficulty. It is actually an awareness of permanent change. Our attitude to this crisis, to this change, is to see that the change is brought about for the good and not for the bad.

First of all, we must combat wastage and disparities, both of which will lead our world down the road to extinction for want of resources. Secondly, we must take all the necessary steps to see that relations among states take these new circumstances into consideration.

I think it was at the time of the energy crisis that there was the realization, more than ever before, of the extent to which nations are interdependent. In fact, when confronted with events like these, all nations have to rely on each other; all are affected, the poorest countries quite obviously, but also the wealthy countries like the United States, for example, which in the next few years will see its dependency on other countries grow and not, as is sometimes thought, diminish.

Interdependence will reach out to embrace all states, including the oil-producing states, with respect to outlets for their products and the investment of their surplus.

Given a situation in which countries are interdependent, it stands to reason that we have to look for solutions which do not lead to domination. And this is why top priority in French foreign policy will be given each time to solutions that are based on consultation and negotiation. I believe that these solutions are possible.

In today's world there is a temptation to withdraw from the path of cooperation because of the resources that are being transferred. It's conceivable that this transfer of resources is making us lose interest in the fate of our partners. But this would be a totally selfish view, contrary to our nation's mission. Cooperation is one of France's great endeavors. I hope that in the future it will be one of the great endeavors of Europe, and that France will continue to make a substantial contribution to it. To be frank, we did actually reduce somewhat the percentage of our national product devoted to cooperation. In the future, we will have to get this percentage moving up again.

—from a press conference, Paris, October 1974

Mary S. Calderone
Physician, Sex Educator

We are in the midst of a human energy crisis. People are afraid about the present: money, crime, jobs, aging, a world in disarray, people and nations arrayed against each other. There is also a sharp loss of confidence in father figures in government, which reawakens our earliest childhood fears of abandonment by parents. So people also fear the future.

Because fear immobilizes human energies, we need to mobilize ourselves so that we can get out of the vicious circular fear trap. I believe that:

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(Continued from page 67.)

(1) Human *intelligence* is clearly more than adequate to cope with and to overcome any and all human-created problems. It is the human *attitudes* of greed, suspicion, bigotry, and expediency at any cost that interfere and prevent development and application of adequate coping mechanisms. And once again, these negative attitudes not only spring from irrational fears but also themselves serve as sources of renewal for continuing fear.

(2) The basic new approaches needed for the release of human energies blocked by fear are those designed and devised (a) to heighten and to support people's awareness of themselves as valuable individuals and (b) to reestablish and reinforce their own personal sense of well-being and trust in themselves and in others like themselves. This sense is far removed from the false concept of pleasure as purchasable that is operative today, initiated and supported in the bread-and-circuses pattern by the very ones who will profit by it.

(3) If I were not hopeful, would I at 70 continue to knock myself out to overcome one of the most dangerous sources of energy-blocking fear—fear of one's incapacity to function successfully as a sexual human being, in childhood, adolescence, adulthood, old age, in one's roles as friend, lover, spouse, parent, grandparent, and citizen? The pattern of SIECUS [Sex Information and Education Council of the United States] has been as far as possible to institutionalize the positive approach to sexuality as integral to the total personality structure, and we now see mounting institutionalized approaches to this concept on the part of the health sciences, the behavioral sciences, and the social-service and ministering aspects of religious practice.

George C. McGhee
Chairman of the Board,
Saturday Review/World

We live in an era of crisis and conflict. Men of goodwill, however, if they seek it, can find evidence that the human race is still impelled onward by that God-given inner urge that has, over the eons, lifted it to the apex of life on this planet. For the first time in decades, the world is at peace. Significant progress has been made in conciliating the two opposing world blocs and in furthering nuclear-arms control. Supplies of food, fuel, and materials in the world are adequate if we can distribute and arrange payment. Many states have seen the fruitful results of their efforts to relieve population pressure. Many cities—historic London being only one example—have cleansed themselves of pollution. Under the aegis of the United Nations, conclaves of all states are for the first time facing problems of the environment, population, energy, food, the oceans, and housing on a world basis. There is hope—if we will only rededicate ourselves to its fulfillment.

Elizabeth Janeway
Author, *Between Myth & Morning: Women Awakening*

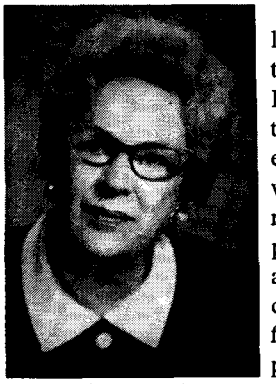
Sometimes I wake up in the morning and feel hopeful, even to the extent of saying, as did William Faulkner, "I believe that man will not only survive; he will prevail," though (in my opinion) he will do so most readily if he turns for frequent guidance to those ancient female figures of wisdom, the Sybils, the Fates, and the Norns.

But sometimes I wake up in the morning and feel that James Thurber and Woody Allen more probably have the right of it, and that thrips, Dutch elm disease, tangled synapses, and the claw of the sea puss will get us all in the end.

Today is an okay day.

Human intelligence (to answer your question) is certainly equal to the problems of our time. Is human motivation? If it is, it will naturally produce new institutions and basic new approaches, through which we deal with the Dilemmas of Our Time. We won't have the foggiest idea that they are there till they take hold, and we'll probably hate them when they do. At least, society now has access to women's brains and talents, instead of only men's. That's a double, anyway. So maybe we have a fighting chance.

Mary Roebling
Chairman of the Board, The National State Bank, Trenton, N.J.



Human intelligence *is* equal to its problems. But no set of alternatives, however intelligent, will successfully resolve such problems as war and peace, dwindling resources, famine, overpopulation, and a possible breakdown in the conditions that sustain life, unless Americans and the people of the industrialized world grow up in our time.

What does growing up in our own time mean? Fundamentally it means designing new concepts of the good life and then restructuring the attitudes of consumers and producers toward a pattern of stabilized or limited growth.

We are at the end of an economic era. For 150 years, from the birth of the Republic to 1932 or 1933, we had governmental spending kept down to relatively small levels. In the past 40 years, we have had a revolution.

Inflation is not caused by government alone. We could also blame labor unions for the aggressive wage policies, corporations for the exorbitant prices, bankers for the high interest rates, and the Federal Reserve for the misguided monetary policy. Taxation is exclusively the blame of government. Inflation is also less tolerable today, because expectations of higher prices are influencing our economic decisions in such a way that they cause inflation to accelerate. We have learned the hard way that a little inflation is like a little pregnancy. We thought that the 2 percent annual inflation of the Fifties and Sixties would last for the rest of our lives, but of course it has not.

If President Ford has declared inflation America's number-one enemy, it is also the number-one enemy of all of the nations of the industrialized world. I am a dedicated champion of our free-enterprise system, and I believe that responsible government, business, and labor will end double-digit inflation within the next 12 months.

The root of my optimism takes hold in the way American people have successfully survived the challenges of the past 14 years. In every field that can be measured objectively but one—crime—

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we have made enormous progress. This has been true in racial problems, real income (except this year), better jobs, vacation pay, earlier retirement, more people living in their own homes in nicer areas. No matter how we measure progress, we achieved a great many things that Americans have desired for years. Despite inflation and the energy shortage, the way Americans have handled their problems convinces me that they are capable of coming up with sophisticated answers to the tough national questions confronting them. They are equal to the need of coping with the new ethic of the quality of life, rather than the goals of economic success prized by earlier generations. I see a new era of abundance ahead for Americans.

In short, I am basically hopeful about the human future because, though man is irrational, mankind is rational.

Francis J. Dunleavy
President and Chief
Operating Officer, ITT

The basic elements of our industrial and commercial system continue to be sound and to function well, although their strength in many cases is masked by inflation and related factors. Nevertheless, our confidence should certainly be bolstered by the knowledge that we do have a strong base to carry us through the present period—and into a more robust future once some of the negative influences now at work begin to abate.

Another element that should stimulate confidence in the economy is the fact that the government today has much more effective means of dealing with economic problems than it has had in the past. While a problem of the dimensions of the present double-digit inflation rate does not yield to quick, easy solutions, I believe we can manage it sufficiently to avoid economic catastrophe and to enable us to emerge from our current difficulties with our economic system and way of life intact.

I do not believe we are on the verge of a 1930s-type depression, even though we may experience less than ideal expansion while measures are being implemented to lead us into a new cycle of more vigorous activity. Numerous factors demonstrate that we have the capacity to bring about such an era of renewed growth and development.

For example, we have made significant strides in environmental improvement and protection. Fish now swim in lakes and streams where they could not have lived a few years ago. Substantial progress has also been made in reducing pollution from factories, automobiles, and other sources. As a result of such successes, we seldom hear the predictions of environmental doom that commanded our attention only a short time ago.

In the areas of technology, the efforts and investments we have made in previous years are maturing and are ready to pay off in practical dividends that will help to elevate the human condition and quality of life worldwide.

In the field of food production, for example, we can perceive new processes that may erase the terms *malnutrition* and *starvation* from the human vocabulary forever. It may be possible within this generation to develop a means of supplementing traditional agricultural processes by manufacturing basic foodstuffs in a way that is not subject to vagaries of weather or availability of tillable land.

It is evident to me that the United States has the resources and capabilities of continuing on a course of human, social, and economic progress. However, the application of these resources is a function of the human spirit.

Inflation may be the first national problem since World War II on which there is universal accord. Everyone is affected by it, and everyone wants to see it solved. Public-opinion polls, in fact, show that no other single subject since

HELMUT SCHMIDT, Chancellor of the Federal Republic of Germany

We have to recognize that the challenges of the oil crisis have emerged at a moment when the political situation of the world at large is anything but stable. In my opinion the oil crisis has brought an additional element of instability into a world already in the process of groping for a new and stable equilibrium.

One cannot deny the fact that the basic pattern of the world, which existed for many years after the Second World War, has been in a state of flux for some time now. The condominium that largely controlled political life in the world for two decades has ceased to play its previous role. New power centers are emerging, and the trend toward a multipolar distribution of power is quite obvious.

It is self-evident that a high degree of latent instability characterizes this phase of transition to new and non-discriminatory arrangements for a state of peace which would be based on five or six power centers instead of two, as in the past. Statesmen will have but few fixed landmarks to rely upon so long as the new power centers have not been firmly established, because their spheres of influence have not been consolidated and their mutual relations have not been clarified. There may even be cases of diplomatic demoralization and international anarchy.

In this situation it is all the more important to keep the number of potentially disruptive factors to a minimum and to canalize disturbing influences by mutual agreement as far as possible. At the same time those who have hitherto worked together on the basis of an alliance and a common philosophy will have to make every effort to prevent the inevitable changes from jeopardizing the foundations of their mutual understanding or loosening the vital ties of partnership and friendship.

With reference to the partnerships between Germany and the United States and Europe and the United States, this means that we shall have to continue developing such partnerships and to find ways and means of cooperation in fields where so far there have been more or less isolated efforts only; that is to say, in many sectors of the economy, of technology, as well as of energy supply. Future tasks will have to be focused on these points.

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that war has so grasped such widespread individual attention.

To me, this a good sign. It is times such as these that generate national consensus in pursuit of a common objective and that motivate people to make the sacrifices and otherwise to do whatever is necessary to turn around these adverse conditions.

Given this condition, and the fundamental strength of our economic and social systems, I look for the nation to surmount the obstacles now before it and to resume its progress on all fronts.

Helen Delich Bentley
Chairman,
Federal Maritime Commission

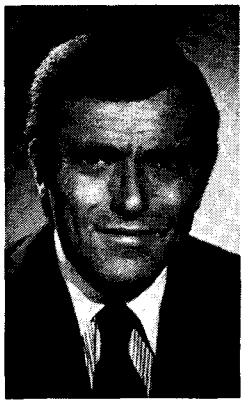
I regard myself as basically hopeful. I feel, however—and very strongly so—that the biggest obstacle that we must overcome is indolence. No two ways about it—low productivity among our people is, in my opinion, the major contributing factor (in the United States, at least) to the problems of our time. People in other nations may not be quite so willing as we are in America to take the easiest way out, but the seeds of decadence—nurtured by prosperity—will surely take root worldwide if people refuse to look objectively at the fruits of their labor.

In saying that I am optimistic about the human future, I should add that we have the intelligence, the experience, and the will to overcome our problems—provided that they are correctly identified and understood in time.

Harvey L. Schein
President,
Sony Corporation of America

The United States is not in, and certainly should not have, a depression. There is absolutely no reason for such an eventuality, considering our boundless resources, both human and natural. The great danger is that we could talk ourselves into a disaster. The greatest task we face is the restoration of confidence.

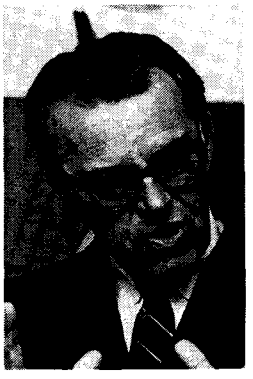
There is no question concerning the energy situation: I am disturbed by the



fact that most of the world is not banding together to take steps against those nations that are selfishly jeopardizing the well-being of the world. That nations will cut back production of fuel, in order to maintain a price that is strangling most of the world, is to my mind an immoral act. The world should consider taking steps to counter such criminality.

I am very confident that other sources of energy can be developed. I believe this need should have top priority. Meanwhile, we and the rest of the world should cut back on energy use so that the outflow of money to purchase foreign energy can be limited until alternative sources of supply in the United States, Western Europe, and Japan can be developed. I believe that strong, positive leadership is necessary to bring this about.

Edward E. Carlson
President, United Airlines



I am optimistic as to both the future of the human race and the future of the United States. Pessimism essentially springs from fear. If our ancestors had been pessimistic about coming to this country—fearful of the ocean crossing, fearful of the unknowns of a new land—most of us still would be in Europe today. The United States traditionally has been a country of optimists, inhabited by a people who have been confident of their ability to solve all problems. That confidence has been a source of national strength and achievement.

According to most economists, the United States is in a period of recession, but my feeling is that it will not deepen into a depression. More than 86 million are employed and, although unemployment has increased this year, about 1.3 million have joined the work force since January 1, 1974.

As for measures to improve the economy, it would seem that easing of monetary restraints would serve this purpose. Control of credit is an essential short-run economic tool in fighting inflation, but over the long term, this country must also finance an expansion and modernization of its productive plant to head off shortages and to achieve productivity gains. To do this, interest rates must be reduced and capital markets restored to a healthy condition. At the same time savings must be encouraged in order to make the money available for financing necessary capital improvements and the equipment to increase efficiency and environmental protection.

As a visitor from overseas recently remarked, the United States is suffering from a "recession of the spirit." In a material sense, we are doing well and, in relation to the rest of the world, we continue to be a favored people. However, a large section of the population views tomorrow with misgivings instead of with confidence. With the change in our value systems, many seem to have lost faith in established ways and traditional institutions. We have cynicism in place of belief, wisecracks in place of wisdom—a tendency to tear down rather than to build. We need a revival of confidence in our political and economic systems—a renewal of the American spirit.

Eleanor Bernert Sheldon
President, Social Science
Research Council

The basic assumption of social-science disciplines is that scientific perspective and scientific research can indeed help to alleviate serious contemporary problems. It seems almost axiomatic in the social sciences that institutions evolve and change over time and that new institutions are continually created to cope with new problems. To give a concrete example: The interconnections of modern society are becoming so complex that secondary, unanticipated consequences of all decisions have to be considered very seriously. Yet we have relatively few decision-making institutions that are capable of anticipating such secondary or systemic effects, and

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there is justifiable and widespread interest in creating them. The fledgling Office of Technology Assessment in Washington is one example of such an institution. Another is, of course, the Environmental Protection Agency, which was created to deal with the secondary effects of a wide range of individual and societal decisions. Nobody *wants* to harm or to destroy the environment, but the environment is often threatened by decisions made with other ends in view.

I am cautiously hopeful about the near future, because there is such widespread awareness of the complexity of our problems and because there are so many talented social and natural scientists throughout the world who are carrying out research that will enable us to understand them better.

My optimism does not stem from the amount of knowledge we now have (because we have so little), and certainly not from a blind faith in science and scientists (because irrational elements in science and disagreements among scientists show few signs of lessening). Rather, its sources are precisely in our awareness of these limitations. As humility increases among scientists, the prospect that their work will make a positive contribution to society may also improve.

E. Roger Montgomery
Chairman of the Board,
Champion International Corporation

(1) I do not believe that the United States is on the verge of a depression, and I consider that the restoration of a spirit of cooperation between the administration and the Congress to provide coordinated national leadership is essential to an early resurgence of the American economy, however difficult this may be to achieve in practice.

(2) I place high value on intangibles of the human spirit in combating threats to the United States of whatever nature, be they economic or otherwise.

(3) I believe that energy costs will progressively increase rather than decrease, necessitating a cooperative energy-economy program among the principal consuming nations. The United States should suffer less than most other highly industrialized countries because of our large supplies of coal, which, if properly exploited, can bridge the gap until the pipeline and ultimately thermonuclear energy become a reality.

Joan Ganz Cooney
President,
Children's Television Workshop

(1) I don't believe that the lack of human intelligence has anything to do with the overarching problems of our time, but rather the seeming inability of people and institutions in free societies to work together toward agreed-upon goals. Our basic problem, it seems to me, is that both individuals and institutions are trying to protect their own positions as they face the need for change.

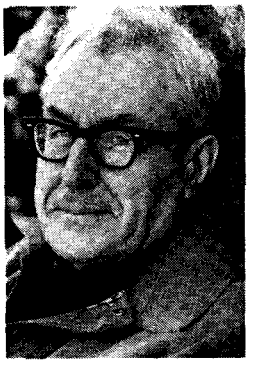
(2) The questions we'll have to face are: Should large monopolies be broken up into smaller units? Should the federal government have less power and state and city governments more? Do we have too many institutions trying to sustain themselves after the need for them has gone? Is it possible to shift the emphasis in government spending from armaments to, say, housing, without guaranteeing jobs? If we won't guarantee jobs, is it possible to achieve any significant change? Finally, can the hard decisions be made and made to stick in a democratic society that has prized, above all, individual freedom?

(3) I feel neither basically hopeful nor despairing about the human future. I rather think we'll muddle through, particularly if a new generation of leaders emerges not only in the United States but also around the world—leaders who can articulate these issues and somehow get people to accept the fact that their survival depends on change.

Dr. Loren Eiseley
Anthropologist, Educator,
Author, *Darwin's Century*

I regard myself as a midnight optimist—a pessimist who does not believe in pessimism as long as he is alive.

The problems we face today are grave,



one of the most serious being that each of us has little time to educate himself as to the nature of our civilization and technology. What makes the situation especially difficult is that men are living on neither the same religious nor the same technological plane. Some are in the Stone Age; some are in an Atomic Age; and it is difficult for them to understand each other. Take, for example, the ruthless Arabic feudalism that controls fuel. That society will not be sentimental about ways it approaches the difficulties with the Western world.

Moreover, we must remember that science is just as two-edged and as ambivalent as the human being himself. Science solves problems, but the solutions lead to new problems.

But man has struggled through his problems in the past—problems that involved even the fall of entire societies. As long as we are alive, as long as we are human, we will continue that struggle.

When Rome fell, I'm sure that there must have been some people who had insight into what was happening, but who could do nothing as individuals to alter the course of events.

Certainly there are intelligent people today who realize that we have created a juggernaut that threatens our survival. But society is now confronted with problems that the individual is not in a position to handle. Even if the atomic weapon is never decisively used, it has perhaps forced man into other types of competition that result in "dirty little wars around the peripheries of the world" or into the use of economic resources as weapons.

As a social scientist, I know that institutions tend to be created if they are needed sufficiently or—what happens more frequently—the old institutions are modified to assume new duties.

Urban decay and the anonymity of the great city create a new series of problems. Man is just beginning consciously to grasp what his social institutions are and what the forces may be which could destroy or drastically alter them.

(Continued on next page.)

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INDIRA GANDHI,
Prime Minister of India

The quality of life has many meanings. In my grandfather's time it consisted of cultivated conversations and gay parties amidst rich materials, beautiful silver, exquisite carpets. By the time I reached the age of appreciation, these were all things of the past.

My father's sensitivity made him abhor all show and ostentation. My mother, too, though for a different reason. She was by nature simple to the verge of austere. I grew up with only one thought: that nothing at all mattered without freedom. There could be no quality under the humiliating conditions of colonialism. This was an obsession that gained wider dimensions after acquaintance with Western liberal thought. An obsession sears, but it can also inspire and strengthen. No one who has not shared the experience can imagine the intensity and all-pervasiveness of this feeling.

I was, of course, aware of the evils of our social and economic structure. Our own freedom struggle had generated a great movement for the reform of Indian society—to change the unequal rural structure, to eradicate the monstrous practice of untouchability, to bring about communal harmony, to defend women's rights. It was intolerable that some sections of the people should exploit others, or that a person should be condemned to inferior status by reason of his caste or sex, or that there should be any difference on account of religion.

Once we had attained political independence, we were also free to deal with these questions. For freedom would be meaningless for the millions whose lives were overshadowed by poverty, inequality, and superstition.

A certain material well-being is presupposed for any description of quality. The crucial word is "certain." What is the minimum level of material welfare that is absolutely essential?

As we have progressed, material prosperity has gradually seeped downward. Some sections remain below the poverty line, but many classes and sections are far better off than they were. However, society as a whole has become permeated with acquisitive thinking; the market and advertisements constantly beckon to better, more attractive goods. Demand and dissatisfaction grow together. The affluent, the better off, the better equipped with power, money, organization, or even an aggressive personality get the larger share, leaving less and less for the poorer and the weaker sections.

I am not lauding the old society. I have myself rebelled against tradition and meaningless conventions and rites. There can be no quality without freedom of spirit, freedom from fear, and freedom from deprivation, whether of food or of what one needs for mental and spiritual growth. And the old society with its authoritarianism, its built-in inequality, the narrow confines of custom and habit, made all the more oppressive in India by the divisions and taboos of caste, did deny the freedom to think and to develop. There was leisure for only a particular class. Yet the very confines, the accepted norms, gave some sense of belonging and security and, for those who hesitated to think for themselves, a well-settled direction. Industrialization has shaken this security but without strengthening those aspects of personality, without cultivating mental attitudes and abilities to hold one's own and to grapple with the whole new set of challenges and problems that are being thrown up.

Science speaks of light-years, but the human mind seems only to grasp the immediate. The world has changed, but not the proportion of rich to poor. Some societies have abolished hunger, but this cannot be said of the world as a whole. Production grows apace unaccompanied by any machinery or even real desire for equitable distribution. But if people's absorptive and reflective power has not grown, their visual observation has. It is not hard for the poorest and the most unlettered to see the distance between his poverty and the affluence of advanced nations or some sections of his own. Millions now know that their misery is avoidable, that the world has the means to give them a better deal. Indeed, for the first time in history, mankind has the capacity to solve the problems of hunger and want. It is true that there are more mouths to feed today, and the growth of populations is a real issue and must be checked. But all of the world's imbalances cannot be visited on this one factor. When it is known that the level of consumption in many affluent countries is 20 times more than that in the poorer countries, it is evident that with a more rational rearrangement of needs and resources the hungry can be fed and the sick tended.

The stumbling block is the assumption that nations that had an earlier start in industrialization have a superior claim to the utilization of resources. The prospector's right is accompanied by greed for quick gains, by a lack of concern for the long-term perspective. The problems of worldwide poverty and pollution are both products of the unbridled profit motive. What is considered "efficiency" has cast its accompanying shadow in the shape of spiritual disquiet. Increasingly, the question is asked, "Comfort at what price?"

To me, the good life means the appreciation of quality, no less than quality itself, the effort toward excellence in achievement, pride in work, and a sense of inner harmony. It means the constant expansion of awareness, the stretching of one's ability to observe, to feel, and to comprehend. I do not think this implies complacency or acquiescence, nor does it conflict with any instincts of rebellion.

The quality of life of an individual lies not in what he has but what he is. It can be measured only in his capacity to achieve harmony and resonance with his fellow human beings and with nature, to perceive the meaning of thought, and to experience the beauty of action—in short, to find joy in life. This is what will lead human beings to richer, more creative, and fulfilling lives.

Can this vision be achieved? The purpose of life is to believe, to hope, and to strive.

The various movements of the black and brown peoples, women's liberation, and youth power are all different facets of the desire of those who for ages past have been made to feel inferior and helpless to discover and establish their own identities and to make their presence felt, their voices heard, in the affairs of their societies, their countries, and the world. This can be possible only in systems of national and international government that give full opportunity for the individual to participate.

There is the simplicity of tribal and rural folk, but there is also a return to simplicity that is consciously achieved, as if coming full circle after traversing many experiences of sophistication. Similarly, I feel that decentralized or local government in a sense wider than that with which the word is today endowed

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can be effectively possible only after a centralized government has drawn up a broad pattern and laid the main directions. Without such a centralized government, the country would be fragmented. Equally, without working toward decentralization, we could well throttle local and individual initiative. Conditions must be created to enable personalities to grow and flower, but in their turn people must bear their responsibility and play their part in the endeavor and sacrifice to create such a society.

We in India, along with like-minded people the world over, must continue to work for peace and the lessening of tensions, so that the world's thought and energies can be devoted to ensuring equality of opportunity to all peoples and to a fairer distribution of the world's natural resources and material goods and services. We want to create a new society where a person can grow and develop at his own pace and in his own way and be different if he so desires and where each type or skill is given due regard. Human beings cannot be transformed into angels. Evil, envy, and avarice will perhaps always exist. Our endeavor should be to establish norms that discourage and ridicule these tendencies, which make it more difficult for one man or class or group to take advantage of another, and which will urge humanity toward greater understanding, concern, and cooperation, not because of idealism, but because of the realization that in working for the common good lies his own and his children's future happiness.

Much has to be changed, but much has also to be conserved: the beauty and purity of nature and wildlife as well as the architectural and art treasures of our past. Cooperation and collaboration in these larger objectives are as important and urgent as those in economic, technical, or cultural fields.

I wish for my people not riches or power but their basic necessities, so that they can have the opportunity to be human and to experience the fullness of life, not to be afraid of hardship or sorrow or danger but to meet them face-to-face as part of life. All hopes cannot be fulfilled, nor all aspirations attained. It would be unrealistic to expect to overcome all our frailties, but we can try, and if we succeed even in some small measure, it will be worthwhile. □

Excerpted from *Voices for Life, Reflections on the Human Condition*, edited by Dom Moraes, to be published in January 1975 by Praeger Publishers, Inc. © 1974 by United Nations Fund for Population Activities.

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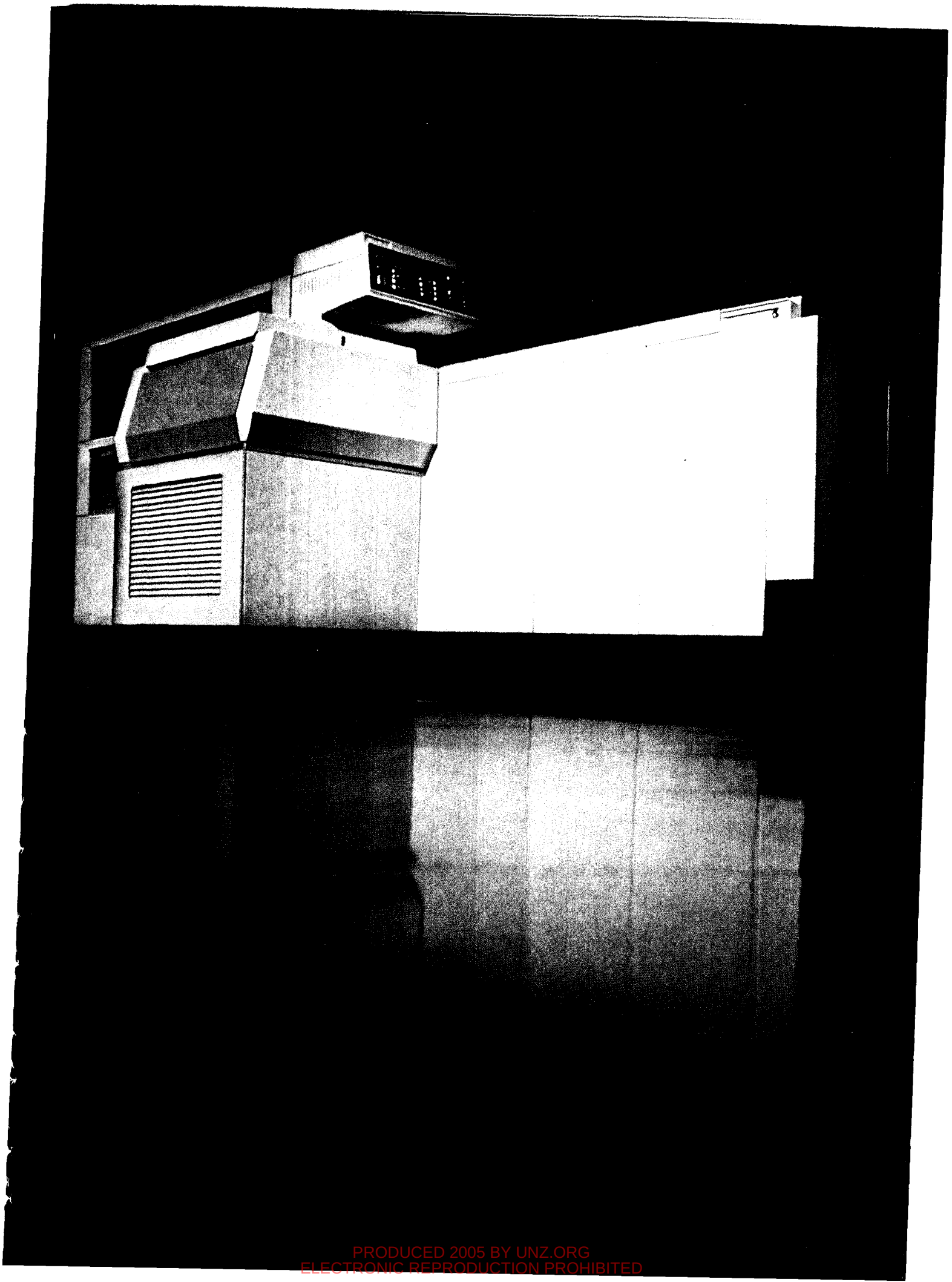

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The Humanizing of Humans

Crises are a source of enrichment and renewal, encouraging a search for solutions. We can't change our genes, but we can manipulate social behavior.

by René Dubos

Culver

Ulysses Shipwrecked—". . . *But rather that you strive for fame and knowledge.*"

My confidence in the future of our species is not due to ignorance of its failings. My confidence is based on two different but related sets of facts. First, the human species has exhibited for at least 100,000 years certain traits which are uniquely and pleasantly human and which are more interesting than those that account for its bestiality. Second, the human species has the power to choose among the conflicting traits which constitute its complex nature, and it has made the right choices often enough to have kept civilization so far on a forward and upward course. The unique place of our species in the order of things is determined, not by its animality, but by its humanity.

In view of the fact that human beings evolved as hunters, it is not surprising that they have inherited a biological propensity to kill, as have all animal predators. But it is remarkable that a very large percentage of human beings find killing an extremely distasteful and painful experience. Despite the most subtle forms of propaganda, it is difficult to convince them that war is desirable. In contrast, altruism has long been practiced, often going so far as self-sacrifice. Altruism certainly has deep roots in man's biological past for the simple reason that it presents advantages for the survival of the group. However, the really human aspect of altruism is not its biological origin or its evolutionary advantages but rather the fact that humankind has now made it a virtue regardless of practical advantages or disadvantages. Since earliest recorded history altruism has become one of the absolute values by which humanity transcends animality.

The existence of altruism was recognized as far back as Neanderthal times, among the very first people who can be regarded as truly human. In the Shanidar cave of Iraq, for example, there was found a skeleton of a Neanderthalian adult male, dating from approximately 50,000 years ago. He had probably been blind, and one of his arms had been amputated above the elbow early in life. He had been killed by a collapse of the cave wall. As he was 40 years old at the time of his death and must have been incapable of fending for himself during

René Dubos, Pulitzer Prize–winning author and microbiologist, is professor emeritus at Rockefeller University.

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much of his lifetime, it seems reasonable to assume that he had been cared for by the members of his clan. Several similar cases that could be interpreted as examples of "charity" have been recognized in other prehistoric sites. In fact, one of the first Neanderthalian skeletons to be discovered in Europe was that of a man approximately 50 years old who had suffered from extensive arthritis. His disease was so severe that he must have been unable to hunt or to engage in other strenuous activities. He, also, must therefore have depended for his survival upon the care of his clan.

Many prehistoric finds suggest attitudes of affection. A Stone Age tomb contains the body of a woman holding a young child in her arms. Caves in North America that were occupied some 9,000 years ago have yielded numerous sandals of different sizes; those of children's sizes are lined with rabbit fur, as if to express a special kind of loving care for the youngest members of the community.

Whether or not the words *altruism* and *love* had equivalents in the languages of the Stone Age, the social attitudes which they denote existed. The fact that the philosophy of nonviolence was clearly formulated at the time of Jesus and Buddha suggests that it had developed at a much earlier date. The Golden Rule, "Do unto others as you would have them do unto you," exists in all religious doctrines, even in those that have reached us through the very first written documents. It must therefore have an extremely ancient origin.

According to the teachings of the Persian prophet Zarathustra more than 2,500 years ago, "That nature only is good which shall not do unto another whatever is not good unto its own self." But since, still according to Zarathustra, the human soul is constantly a battlefield between beneficent and malevolent spirits, human nature is good only to the extent that it *represses* part of itself so as not to do harm to another person. Such an early belief in the need to repress the evil in human nature is a startling expression of the philosophy that being human implies choices. The uniqueness of humankind comes indeed from its potential ability to escape from the tyranny of its biological heritage. Instead of being slaves to their genes and hormones, as animals are, human beings have the kind of freedom which comes from possessing free will and moral judgment. We can repress our animality if we will.

Human beings can choose not only between good and evil but also between other opposite traits of their nature. For example, they can follow their natural tendency to wastefulness and negligence or their desire for order and form. Adorning the body during life with pigments, feathers, and trinkets seems to have been a very ancient practice. What is more impressive, however, is that in the same Shanidar cave which yielded the blind Neanderthalian with the amputated arm, several bodies had been buried on beds of flowers and soft branches. At least eight different kinds of flowers, including relatives of such modern plants as hollyhock, grape hyacinth, and bachelor's buttons, have been found with the bodies. Since the plants could not have grown in the cave or have been carried by animals, the corpses must have been buried with wild flowers gathered from the hillside. Other Neanderthalian bodies found in southwestern France had been painted with ocher and adorned before burial with collars and arm rings made of shells. The Neanderthalian people therefore confronted death ritualistically and with concern.

"In view of the fact that human beings evolved as hunters, it is not surprising that they have inherited a biological propensity to kill."

On his journey, Dante's Ulysses reached, at the Pillars of Hercules, a boundary stone which instructed him not to proceed farther. Yet he exhorted his companions to go on. "You have your lives, not so that you may live like beasts, but rather that you may strive for fame and knowledge." Dante's own view of man was based, however, on the static concepts of Christianity at the end of the Middle Ages; he believed that the search for truth should remain within the framework of the Holy Scriptures. In the *Divine Comedy* Ulysses and his mariners encounter a violent storm which swallows up their ship. Dante thus points the moral that humankind will founder on its presumptuousness if it transgresses the limitations set by God.

In contrast to Dante, Alfred Tennyson believed, as was almost universal in the nineteenth century, that there are no limits to scientific knowledge and therefore to the growth of civilization. When the English poet restated Homer's theme in his own poem "Ulysses," he took it for granted that progress is open-ended and that its pursuit is the very essence of the human condition. His Ulysses proposes to sail "beyond the sunset" with the conviction that humankind will inevitably achieve a better estate just by going forward.

The immense poem *The Odyssey: A Modern Sequel*, by the modern Greek poet Nikos Kazantzakis, reflects the euphoria and also the depths of pessimism which have characterized the twentieth century. His hero returns successfully to Ithaca and settles on his domain as Homer's Odysseus had done. However, he soon becomes bored with his eventless existence and sails once more away from Ithaca, this time for good. With the help of a few companions who share his restlessness, he starts in search of adventure and of the true life. But despite extraordinary experiences in all the citadels of knowledge and of philosophy, nothing positive comes out of his travels. He concludes in the end that there is no intellectual or ethical meaning to life; only art, perhaps, will survive. He had not found satisfaction at home, and he had become aware of the fact that adventure does not lead anywhere. Certain American poets, even more pessimistic, write that the open road leads to the parking lot or to the garbage dump.

THE DEEP SIGNIFICANCE of Ulysses' story, in its many variations, is that the vicissitudes of life come in large part from conflicting tendencies inherent in human nature. Taking to the open road gives many satisfactions, but we never forget our origins, and for this reason we want to return to camp. On the other hand, sedentary life is not completely satisfying either, because we are never perfectly adapted to our social environment, and furthermore we yearn for adventure. We thus constantly oscillate between the two ideals of being and becoming. These hesitations are responsible for much human uneasiness. They are creative, nevertheless, because they engage human beings in a process of self-searching and of external exploration that helps them to escape from biological bondage and to humanize the earth.

The disarray and disenchantment which plague our times show that physical comfort, abundance of goods, and control of disease are not sufficient to

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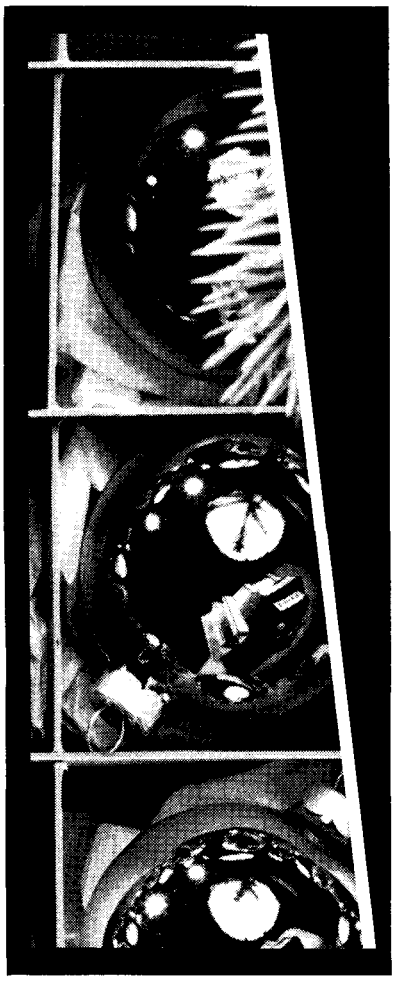

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bring about either individual happiness or harmonious social relationships. A more direct experience of our relationships to nature and to the cosmos would not only enrich our lives but also might become a substitute for the religious sense. The psychological need for belonging to a community might give a modern form to the tribal spirit which has so long been basic to the social structure of humankind and is the historical justification of nationalism. Individually and collectively we would do well to cultivate in our relationships with the external world the subtle quality expressed by the Arabic word *baraka*—the sense of blessedness that attaches itself to buildings or objects after years of loving use. We need also to give freer rein to fantasy—that marvelous human faculty which enriches and embellishes reality by acts of imagination.

Happiness is contagious, and for this reason its expression is a service and almost a duty. As some Buddhists say, "Only happy people can make a happy world." The most useful citizens are not necessarily those who increase production and knowledge but rather those who generate *joie de vivre* around them. Optimism and cheerful spirits are indispensable to the mental health of technological societies. The most valuable personal attribute as well as the most useful contribution to collective happiness is the spontaneity of the smile. More than ever, in Rabelais's words, "*Rire est le propre de l'homme*" (to laugh is proper to the man). The best protection against fate is to face life with a smile. I am using the word *smile* with the meaning it has in the French phrase "*prendre la vie avec le sourire*"—not the stereotyped smile of the airplane hostess or the cigarette advertisements, but the tolerant smile that comes from an amused awareness of the mutability of things.

Certain situations are naturally more conducive than others to *joie de vivre*. From a purely biological point of view, the best environment for the human species may have been the pre-industrial, pre-agricultural world based on the hunting-gathering ways of life. This may be the biological environment to which we are still best adapted, the biological paradise we have lost. But human beings have progressively created for themselves another kind of life out of values found in the arts and sciences, in rites and celebrations, in the search for the absolute. Like Ulysses, they are attracted by the ease of life in the land of the Lotus-Eaters, but in general they continue to prefer adventure with all the efforts, sufferings, and risks it entails. Out of choice many human beings devote a large part of their lives to arduous tasks which are physically uncomfortable and even painful, yet from which they expect the non-material satisfactions they regard as the only worthwhile form of happiness. In many circumstances the realization of an ideal, even though difficult and painful, is the essential ingredient of happiness. There is no obvious explanation for the fact that human beings deliberately place themselves in situations which require strenuous efforts and cause suffering. Similarly, there is no obvious answer to the question that Leonardo da Vinci asked himself in his notebook: "*Leonardo, perché tanto peni?*" Why indeed take so much trouble when physical pleasure can readily be found in animality?

To understand the human species as part of the animal kingdom requires only knowledge of its genetic structure and organic reactions to environmental stimuli. But to understand its humanity, it is essential to know why so much of human life is devoted to tasks that have no immediate utilitarian application—the arts, the sciences, the ceremonies, the innumerable forms of self-sacrifice. Human beings derive their most profound satisfactions—true happiness—from those activities which are the furthest removed from animality. When the German philosopher Benno Erdmann was asked to express his views concerning modern trends in the sciences of man, he sadly replied, "In my youth we used to ask ourselves anxiously: What is man? Today scientists seem to be satisfied with the answer that he *was* an ape." It is not sufficient to know that *Homo sapiens* evolved from a certain kind of primate. A more important question is what he would like, or should try, to become.

A mysterious aspect of human life is that throughout history social groups have abandoned their ancestral habits under the influence of abstract ideas; they have repeatedly rejected their traditions and modified their ways for the sake of an ideal. Equally mysterious is the fact that throughout prehistory and history almost all people have created monumental structures and have engaged in spectacular ceremonies of a purely symbolic nature to which they have devoted more efforts and resources than to the satisfaction of their material needs. The social life of the human spe-

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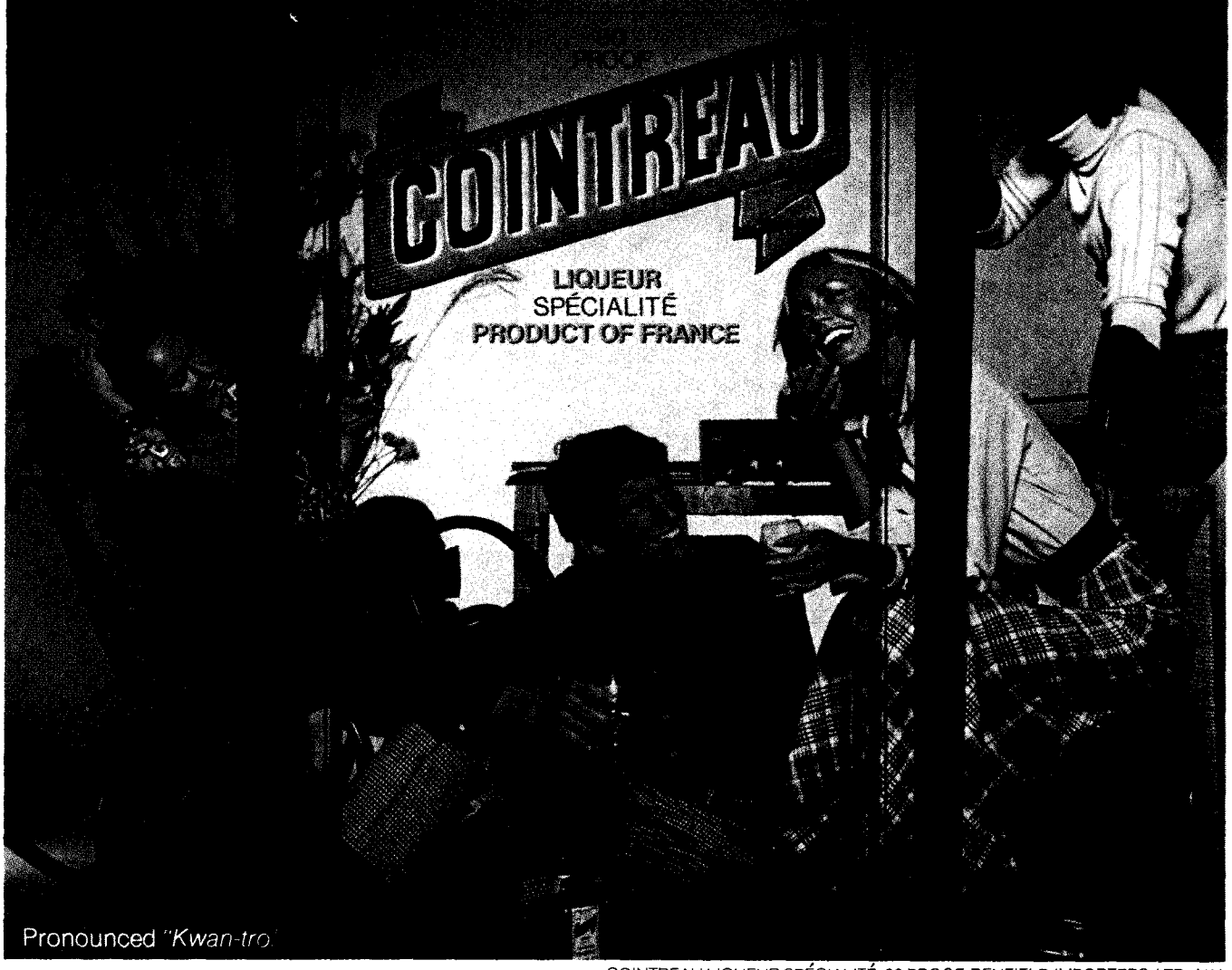

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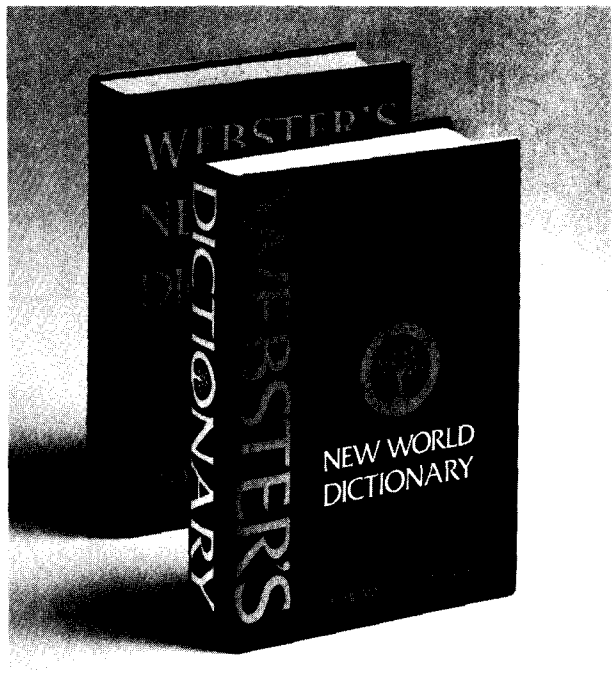

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cies thus seems to be inspired by dreams which make it prefer change to status quo, symbolic creations to the production of creature comforts.

There exists a form of *joie de vivre* which expresses the very pleasure of being alive—a purely organic satisfaction which animals share with human species. But there is another form of happiness, which seems peculiar to human beings. It originates from their deep awareness that their personal life is the realization of their dreams and their collective life a creative enterprise which gives concrete forms to the dreams of humankind.

The emergence and evolution of humanity result from consecutive social adaptations to crises caused by natural disturbances and by willful changes.

Over many millennia human beings have rarely if ever submitted passively to the influences of the environment. They have searched for the conditions they wanted and created them if these did not exist. They have thus been able constantly to renew their civilizations through adaptive social responses to self-selected environments.

Crises are practically always a source of enrichment and of renewal because they encourage the search for new solutions. These solutions cannot come from a transformation of human nature, because it is not possible to change the genetic endowment of the human species. But they can come from the manipulation of social structures, because these affect the quality of behavior and of the environment, and therefore the quality of life.

Civilizations are mortal, but they can be revived and transformed by human imagination, fantasy, and will. It is through the death and resurrection of civilizations that humankind consecutively takes the many forms of which it is capable. Chance—or providence—provides the conditions and materials out of which civilizations can be reborn and renew themselves, but it is the human mind that selects among these options and that organizes the raw stuff of nature into humanized forms. We are human to the extent that we are able and willing to make the choices that enable us to transcend genetic and environmental determinism, and thus to participate in the continuous process of self-creation which seems to be the task and the reward of humankind. □

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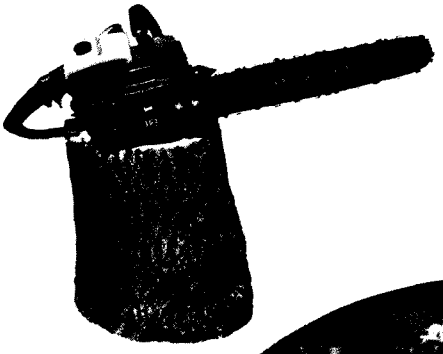

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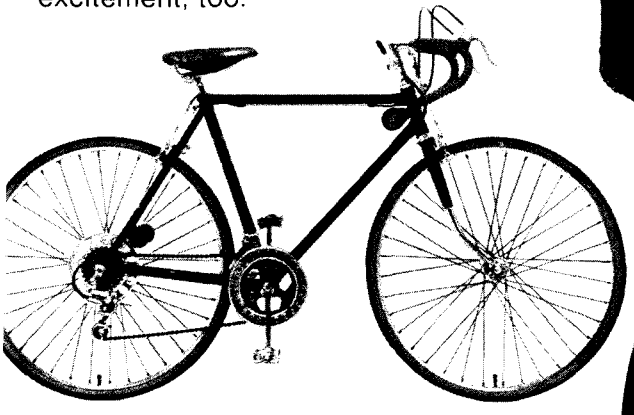

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Art as Hope for Humanity

Man the individual is the creative personality. Man as artist must dominate man as political animal. If he can divert his combative drives, he may survive.

by Yehudi Menuhin

I look upon great works of art not only as isolated gifts and benefactions from heaven but also as high points emerging from a continuing living process. It is upon this view that I base my belief in art as hope for humanity.

When we consider the great violin makers, we realize that their expertise evolved gradually and continuously from centuries of song and string-playing, both in the folk and cultivated forms. Their tradition has roots in a musical, literate culture that is rich in composers and instrumentalists. Our Gothic churches evolved from the yearning of entire populations to reach up to God in prayer. Worship, dedication, love—these are qualities that must reside in the living, thinking, dreaming moments of the population at large before a genius can crystallize a total environment through his own eyes, ears, and hands and thus hold up a mirror, inspiring and moving, to his fellowmen.

Rhythm in music, proportion and movement in other arts—these are the assurances of continuity, of direction, and of design or logic in everyday life. Without these assurances life must often seem to the bewildered individual and innocent sufferer a "buzzing, booming confusion," without rhyme or reason. Thus not only the creative artist and poet, the musician and painter, but also the humblest craftsman *serves* his society. You will find that you can trust a good shoemaker and a botanist, perhaps even a violinist, in a way you cannot always trust a politician, a lawyer, and a financier. The manipulators of men should learn first to use their hands, to manipulate clay and stone and to handle the good earth with gratitude and respect. Our mothers should sing to their children, and our children should sing together. Perhaps no other activity is so wholesome, for it engages completely our *inner* mobility—breath and circulation—our lungs and heart. Our spirit and sense of community are immeasurably enhanced by this exercise: The compelling and total discipline of rhythm and pitch further the sense of union and communal solidarity. When one thinks of the pathetic Balilla Mussolini's marching eight-year-olds, one could cry. And where did it bring them? Fortunately for the children, no Italian can take that kind of rubbish seriously. Marching is the very opposite of choral singing.

Art is, as I see it, a representation—an *intensification*—of life, much as a chess game is a minuscule representation of the ebb and flow of battle. In art, as in life, the elements of predictability and surprise are delicately balanced. Of course, predictability in rhythm and proportion must precede surprise. Spontaneity, surprise, improvisation, are only inspiring and liberating when they occur upon the secure foundation of a base rhythm or a projected order of proportion or both. It is the wobble in the potter's wheel that accounts for the slight irregularity of a vase—the imperfection is deeply touching, for it testifies to the fallibility of a particular pair of hands. The great artist allows his inspiration a certain free rein, which, emerging from his supreme discipline, is a reminder of a human abandon, impulse, and surrender.

We are today surrounded—indeed, *fenced in*—by right angles set along interminable lines: In the United States a national north-south and east-west grid accounts for the streets and buildings of most cities. Americans are the first to recognize the asymmetrical, free-form beauty of Venice, old Bologna, Mykonos, or old Paris. Venice looks no different in reality than it does in the paint-

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The world-famous violinist Yehudi Menuhin is president of the International Music Council of UNESCO. He lives in London.

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ings of Canaletto, Guardi, and Turner. Art holds out a hope for the future if we will allow our cities to be designed by artists instead of by engineers—if we will take into our calculations the artist's conception of space and line and the musician's conception of time and melody. Thus, before we can allow ourselves hope, we must have faith and charity.

Perhaps one day the artist in man will dominate man the political animal. Let us never forget that the bigger units of administration only serve to organize, apply, and develop what man alone, the individual in the unique cultural environment, creates. It is the smaller and smallest unit that has vision and that creates, the larger that applies but *cannot* create. Ultimately, it is upon the individual we depend. Perhaps it is thinking very far ahead to say so, but eventually the nation-state must cede part of its autonomy both to the larger world unit and to the smaller neighborhood-community. On one hand, there must be international cooperation in various fields—food, pollution, space, resources. On the other hand, the nations must encourage regional autonomy—languages, dialects, art, music, theater, dress, diet, way of life, and all human, humane, and cultural activities.

Man's seemingly natural aggressive, combative, competing, and dominating instincts can find ample outlets and expression on other levels than those of the nation-state. We can do without emasculated deliberations conducted in committee rooms, deliberations that are divorced from human pain or pleasure. Let men play the violin, play chess, fence, go to the moon, play Ping-Pong, and write poetry. Let them vie with each other on individual, regional, and world levels. But let them not degenerate into dumb automatons, robots of the nation-state, manipulated physically, spiritually, and morally by the abuse of all their gifts and by the debasement of all their faculties.

I do not doubt for a moment that humankind will find creative alternatives to rigidity, and I do not doubt that art will play a functional, pragmatic role in our salvation. This is, at any rate, my faith—a faith strongly grounded in the traditions that have bequeathed us Michelangelo's *Moses*, Rembrandt's *Night Watch*, Chartres's Cathedral, and Bach's *B Minor Mass*—or Henry Moore's *King and Queen*, Picasso's *Pierrot*, the Sydney Opera House in Australia, and Bartók's string quartets. □

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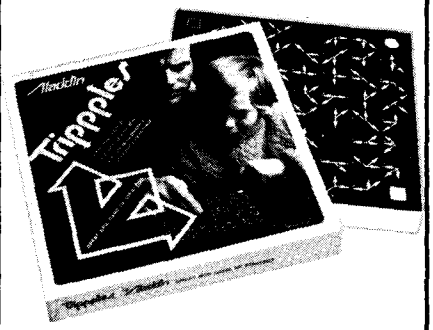

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An Optimist's Checklist

In spite of the dark clouds, a prominent American industrialist has gathered proof that in truth the grass is really greener in your own backyard.

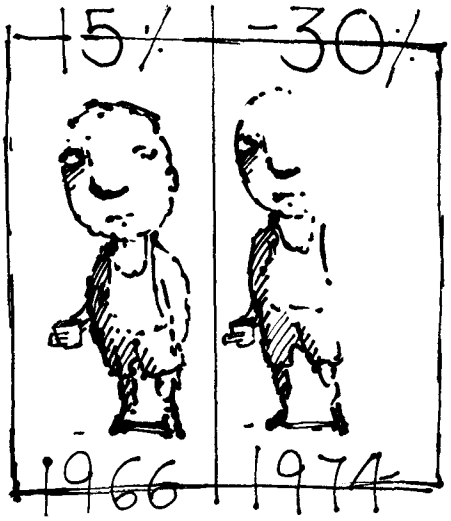
by Lewis Foy

An inventory of hope has to be more than a box marked "futures." In addition to the intangibles that give rise to faith, the inventory list consists of particularized items of progress. Problems that are dramatic in scope have a way of obscuring the dozens of spectacular but nonetheless real advances that furnish the basis for confidence that larger challenges can be met.

Herewith some evidence that we may be making progress on matters of consequence. I list the items in three general categories: economic, social, and material well-being; the situation of disadvantaged citizens; the condition of the environment. Obviously, my list is anything but complete. Even so, it may indicate that significant progress is being made and that we have a basis for believing we can do even better.

Economic and Social Well-Being

Eight years ago, 15 percent of all Americans were officially classified as "poor." Since that time 30 percent have improved their condition to the point that they are no longer in that classification.



Lewis Foy is chairman of the board of Bethlehem Steel Corporation.

Americans, according to the Census Bureau, have a median family income of nearly $12,000.

Nearly all families have refrigerators, radios, and television sets; more than 90 percent have telephones; 92 percent have washing machines; 80 percent have at least one car.

More than 60 percent of all families own their homes.

Illustrations: Ken Rinciari

We spend about 18 percent of our consumer dollars on food; in Great Britain it's 30 percent; behind the Iron Curtain it's about 40 percent; in the underdeveloped countries it's 60 percent.

More than 8 million young people—a quarter of all people of college age—are attending college, and two-thirds of them come from families in which neither parent is a college graduate.

About 52 percent of all Americans 25 years and older have completed high school, and 12 percent have completed four years of college; in 1940, only 25 percent of all Americans 25 and over had finished high school, and only 5 percent were college graduates.

The average American has to work less than half as long to earn enough to buy a major appliance as he had to work 10 years ago.

Some 30 million workers are covered by 32,000 private pension plans through their employers; the companies pay $20 billion a year into those funds. Today, 6 million retired workers are receiving $10 billion a year in pension benefits.

One American in 1,000 (about 210,000) is a millionaire.

The productivity of American industrial workers is more than double that of their Russian counterparts; the productivity of American agricultural workers is more than nine times that of their Russian counterparts.

Ninety-five percent of our country's 63.5 million households have full plumbing facilities; in East Germany, the most prosperous "satellite" of the U.S.S.R., fewer than half of all housing units have private toilets, 40 percent don't have private baths, and 15 percent don't even have running water.

Last year Americans bought 31 million major appliances, 11.5 million new cars, 8 million color-TV sets—and we gave about $24.5 billion to charity, averaging $120 for every man, woman, and child.

Our total tax burden per capita (the percentage of our income that we pay out in all taxes—income, sales, property, etc.) is 28 percent; it's the second lowest among 13 leading industrial countries; in four of those countries the burden is over 40 percent.

The life expectancy of a baby born today in the United States is more than 70 years; in 1920 it was about 54 years.

The Special Situation of Our Female Citizens

Are they making progress?

Headline in the January 20, 1974, *New York Times*: MORE WOMEN ADVANCING INTO KEY BUSINESS POSTS.

The number of women enrolled in medical schools more than doubled (from 3,894 to 7,824, or from 9.6 percent to 15.4 percent of total enrollment) in just three years.

More than 3 million wives earn more money than their husbands.

The number of women elected to state legislatures rose by 19 percent in 1972 and by 26 percent in last month's elections. And the number of women in elective office generally is soaring.

The November 1974 elections showed further gains across the nation, as evidenced by successful women candidates for governor of Connecticut and mayor

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of San Jose, Calif. The recent elections resulted in several "firsts" for women at all levels of government, including the first woman chief justice of a state supreme court, the first woman secretary of state in California, and the first woman lieutenant-governor in New York.

Disadvantaged Minorities

College enrollment of blacks increased by about 80 percent in eight years. In 1972, 18 percent of all blacks between the ages of 18 and 24 were attending college.

In 1960, 38 percent of black males and 43 percent of black females between the ages of 20 and 29 had completed high school; by 1972, this had risen to 64 percent of males and 66 percent of females.

In the past 10 years, the number of blacks in professional and technical positions has increased by 128 percent; the number of black managers, officials, and proprietors nearly doubled.

The total income of black Americans is about $52 billion, which is more than the gross national product of all but nine countries in the world and about equal to India's.

Forty percent of all black families own their own homes.

The number of black elected officials increased by 152 percent in five years, paced by the election of 26 black mayors in 1973; as of April 1, 1974, 2,991 blacks held elective office.

Blacks won two lieutenant-governorships in the November 1974 elections and scored notable gains in southern legislative races. For example, election results indicate that Alabama will have 13 black state representatives and two black state senators compared with just 3 black representatives in the last legislature.

Current Status of the Environment

Three items of interest from the Lake Erie Is (Not Quite) Dead Department:

On July 23, 1973, Larry Eisenhauer caught a 34-inch, 12½-pound muskellunge in Lake Erie at the mouth of a creek that runs through the Lackawanna steel plant. According to the *Buffalo Evening News*, it was the biggest muskie caught in the area since 1946.

The Pennsylvania Fish Commission reports a succession of record-breaking catches of trout and pike and is touting their successful chinook and coho salmon—all in the "dead lake."

Meanwhile, commercial fishermen continue to net annual catches of 30–50 million pounds from Lake Erie, as they've been doing for generations.

Item from the California division of highways: Sustaining the number of horses in this country in "horse-and-buggy" days required 88 million acres—the equivalent of 2.5 million miles of eight-lane highways.

In April 1973, the Office of Air Quality Planning and Standards of the U.S. Environmental Protection Agency reported the results of a 12-year study of the air of some 50 cities. The report showed average center-city concentrations of suspended particulate matter to be down by about 20 percent, while sulfur-dioxide concentrations had decreased by about 50 percent.

The American steel industry is cleaning more water every day than the cities of New York, Chicago, and Los Angeles combined.

Twelve years after Rachel Carson wrote *Silent Spring*, the U.S. Fish and Wildlife Service reported increasing populations of many bird species, including robins, barn swallows, house wrens, ring-necked pheasants, white-throated sparrows, wood thrushes, and eastern phoebes. Even the bald-eagle population is holding steady, if not increasing.

In 1972, Hawk Mountain Sanctuary, in eastern Pennsylvania, reported its biggest count of migrating goshawks since 1935—a 46 percent increase over the previous record. In 1973, spotters counted the most sharpshin hawks since 1939 and the most golden eagles since 1958.

New York City newspapers have been reporting vastly improved fishing in the Hudson River, now cleaner than it has been for perhaps 50 years. Even the shad and bass are running in the Hudson.

Item from *The New York Times:*

> In the past few years the return of the spectacular bluefish to Connecticut waters has jolted the sports fishing industry in the state back to life. Because of the antipollution laws in Connecticut, the rivers are cleaner. Because the rivers are cleaner, the [Long Island] Sound is cleaner, and the huge schools of menhaden, which feed on plankton, swim closer to shore than they have for decades.
>
> And in come the blues for a big meal.

Total expenditures by the American steel industry for pollution-control equipment, actually spent since 1966 or planned, rose from $1.3 billion a year ago to the current figure of $2.1 billion. That figure doesn't include the costs of operating and maintaining that equipment—about $200 million a year. Bethlehem Steel's pollution-control expenditures now add up to more than $250 million, and the company expects to be spending $80 million a year for some years to come.

The foregoing list is not to suggest we can sit back and engage in self-congratulation, but our great country has demonstrated the capacity to cut into our problems, and we must believe that even greater progress is possible. No need on earth is greater than the need to improve the human condition, and in the long array of essentials required to fill that need, confidence comes first. Such confidence need not rest on wild hopes—it has history behind it. □

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Granger Collection

With President Truman at his elbow, Secretary of State Edward Stettinius signs the charter of the United Nations.

How to Save the United Nations

A former American ambassador to the world council outlines a 10-point program for the survival of what Adlai Stevenson called the last hope of mankind.

by Charles Yost

The United Nations was conceived in 1945 by Franklin Roosevelt and Cordell Hull as an antidote to U.S. isolationism after World War I. Roosevelt and Hull regarded a strong international organization as the best way of involving the United States durably and constructively in world affairs.

They knew, moreover, that while sovereign nations would long remain the main actors on the international scene, the old balance-of-power system had failed to prevent two world wars and could not be counted on to prevent a third and a fourth.

During the first two decades of the United Nations, the United States provided much of the necessary inspiration, leadership, and resources. Most of the special agencies (health, food, labor, economics, environment, and so forth) were set up at our initiative. Even now we continue to have more influence in the United Nations than does any other single nation.

However, during the past 15 years, membership has grown much more numerous and more diverse. There are now 138 members, of which more than 90 are so-called non-aligned countries from Asia, Africa, and Latin America.

The United States therefore is no longer able to obtain U.N. approval of action that does not have wide support among the non-aligned countries. Sometimes resolutions of which we strongly disapprove are pushed through the assembly. However, it is important in this connection to emphasize two points.

First, the United Nations is an association of sovereign states with significant but strictly limited powers. Its General Assembly acts by majority vote but, except in budgetary and administrative matters, can only *recommend*. Its Security Council can decide on concrete action to counter threats to peace, but in the council the United States and four other permanent members have a veto. The United Nations cannot therefore dictate to the United States—or to anyone else.

Second, the United Nations reflects the world as it is. Whether or not this arrangement is sensible, there *are* more than 130 independent nations. We cannot ignore them or get along without them. A war in the Middle East, for example, threatens peace between the United States and the Soviet Union and leads to an embargo of our oil supplies.

Examples could be multiplied. In the interests of our own security, we must deal with everyone else, and we can usually do that best through an international organization where almost everyone else is represented.

During most of the past six years, the dominant turn of the U.S. government in foreign policy has been in the direction of the old balance of power. There has been a disposition to act alone or with a handful of other leaders and to exclude from vital decisions not only most other nations but often the American Congress and people. The U.S. government has based its so-called structure of peace on fleeting personal relationships rather than on established and lasting international institutions. That strat-

Charles Yost, former U.S. ambassador to the United Nations, is president of the National Committee for U.S.-China Relations.

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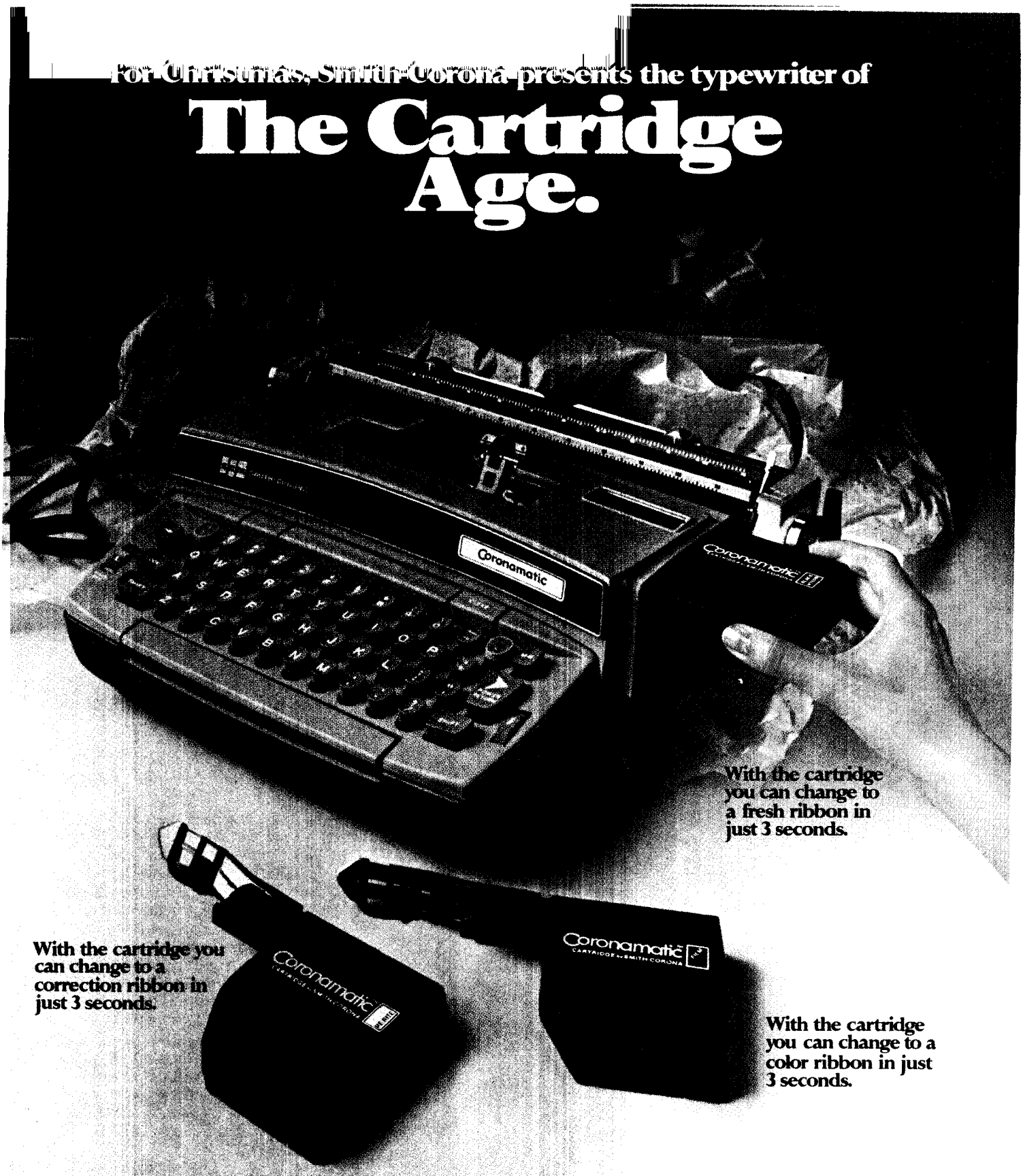

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Aluminum building products can help your house put the crunch on energy consumption. One example is Alcoa® Siding. When properly applied over reflective aluminum foil, it forms a protective insulating envelope that can reduce heat loss in winter and heat gain in summer. Read on for more ways to beat the weather.

Storm windows and doors can effectively "button-up" your house. They're a traditional barrier against cold and can save up to 15 percent of the energy used to heat the typical home. Low-maintenance aluminum frames can stand up to all kinds of weather. Tightly closed aluminum venetian blinds can reduce heat gain through windows and save on air conditioning costs.

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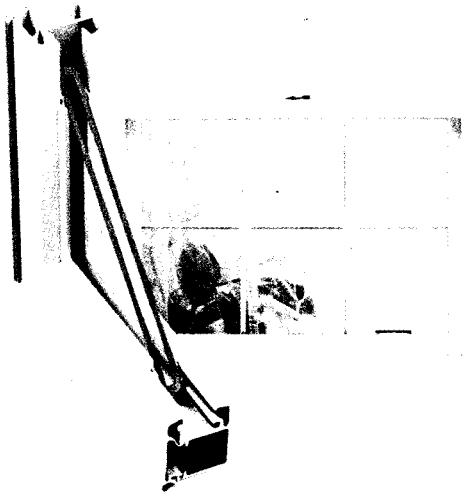

Inadequate insulation can cause one of the biggest energy drains on your house. Sixty percent of the heat loss through uninsulated walls and a full 90 percent of the heat loss through an uninsulated roof can be prevented by proper insulation. Aluminum foil acts as a vapor barrier when attached to fibrous insulation and will help maintain high humidities that make lower room temperatures more comfortable.

If you'd like to learn more about how Alcoa Siding can help insulate your home, write for our brochure, *Home Insulation Can Be Beautiful,* Aluminum Company of America, 348-M Alcoa Building, Pittsburgh, PA 15219.

The reasons for using aluminum are found in aluminum itself.

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egy simply will not work in the Seventies.

The main challenge, of course, is to strengthen the United Nations and to give it the means it needs to do its main job. Here are 10 suggestions for accomplishing that purpose:

• The United Nations could and should, under U.S. leadership, play a much more active role in the peaceful settlement of international disputes that might otherwise lead to war. Significant means of doing so are provided in the charter and have been developed in U.N. practice over the past 25 years. Far too often these means have not been used at all or have been used too late to prevent war. Debates in the General Assembly are no substitute for quiet diplomacy directed to durable peaceful settlements.

• The United Nations could and should, under U.S. leadership, play a much more active role in peacekeeping; that is, in placing forces or observers between contending parties until pacific settlements can be made. When the United Nations has been authorized to engage in peacekeeping, as in the Congo, Cyprus, and the Middle East, it has usually succeeded, but both large and small nations still too often prefer unilateral adventures to multilateral peacekeeping.

• The proliferation and burden of armaments, both nuclear and conventional, is one of the greatest threats to global security and progress. None of the big powers are sufficiently using the several U.N. conferences and bodies charged with negotiating limitation and reduction of armaments. This problem cannot be resolved exclusively inside the United Nations, but neither can it be resolved exclusively outside.

• The second greatest threat to mankind's future is the pressure of rapidly growing population on finite and diminishing resources. Population growth is mainly occurring in the underdeveloped countries, and only they can control it, though developed countries can help. For several years the United Nations has had a Population Program and in 1974 held a Population Conference. These instruments offer the best chance of bringing about a gradual halt to the population explosion.

• The most vital natural resource is food. It appears that critical shortages, leading to widespread famine, will occur within the next year or two. The United Nations also held a World Food

(*Continued on page 92.*)

William Karel: Gamma

United Nations forces at Kilometer 101 during the October war, above, and at Nicosia, below, last July—*"Nations too often prefer unilateral adventures."*

Michel Laurent: Gamma

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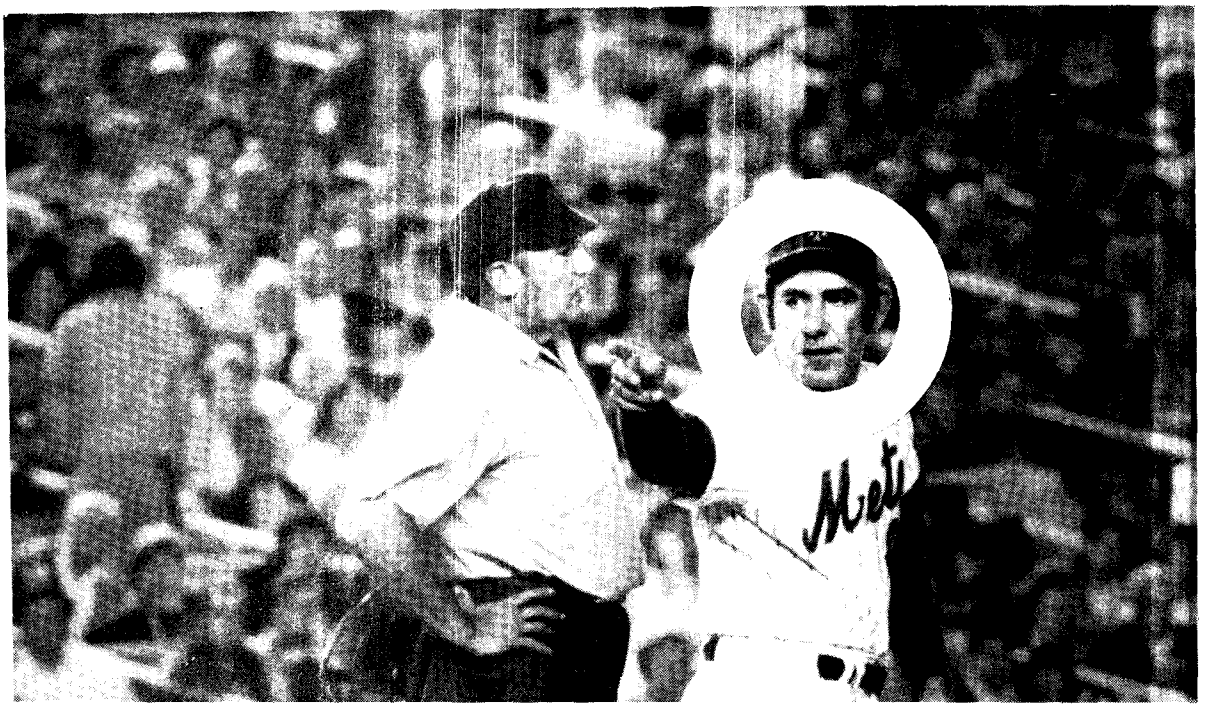

THEIR IDEAS CAN HELP PROVIDE...

Enough Energy for Americc

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We've been tuning in on America and we like the realism on energy we're beginning to notice.

More people now seem to understand that our energy problems didn't end with last winter's gasoline lines. That reducing dependence on imports, which supply more than a third of the petroleum used in this country, will be a hard pull for a decade or longer. That, in the meantime, we've got to scramble for energy wherever we can get it here and abroad.

Yogi Berra's got the key word for what the effort will take. Teamwork. It does the job for baseball's New York Mets, most years anyway. And it's absolutely critical to greater energy security. Industry, government, environmentalists, consumers—working together instead of feuding.

Improving America's energy position will take a willingness to let the free market do its job. Missouri's Claudie McQuerry, the farmer in our circle, dislikes having to pay more for fuel. But he knows from growing corn that it takes realistic prices to offset rising production costs. And it requires time before price incentive brings in more production. In the petroleum business, the lag between finding and producing new oil and gas is often three years or more.

There's a need, too, for government restraint if the petroleum industry is to attract hundreds of billions of dollars in new investment to find, produce, and refine enough fuel for the decade ahead. Because nothing could hurt worse than excessive government interference. Today's acute shortage of natural gas, for example, traces directly to imposition of wellhead price controls on gas 20 years ago. They brought bargain-basement prices, stimulating demand while killing incentive to look for new reserves.

If America's long-term energy position is to be sound, everyone must help:

Industry—supplying know-how, taking risks, raising unprecedented capital.

Government—setting durable ground rules, providing a sound investment atmosphere, slashing red tape, helping with research. There's need, for example, to clear the way for deepwater ports (so still-needed imports can be handled efficiently in very large tankers). It's vital, also, to end administrative delays blocking new oil and gas exploration off our coasts (where geologists think America's biggest undiscovered reserves may lie). In research, government can help make down-the-road fuels like solar energy and nuclear fusion commercially feasible; and help resolve the environmental problems in producing energy from the West's abundant coal and shale.

Environmentalists—they'll have to compromise, but not with their principles. Walt Welles, the sailing enthusiast in our circle, depends on diesel fuel and on petroleum derivatives like his maintenance-free plastic hull and quick-drying sails. But he's counting on advancing technology and strict regulation to minimize oil spills and other pollution. Oil companies can live responsibly with that kind of trade-off.

The consumer—he's got a role, too, nurturing that conservation ethic he learned in last winter's emergency. Making precious fuel stretch.

Everyone, in short, making a team effort, providing in the years ahead enough energy for the economic growth so essential to social progress, material well-being and a cleaner environment.

Count on us to be team players.

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(**United Nations:** *from page 89.*)

Conference this year. As the leading producer and consumer of many staple foods, the United States has an interest in helping to expand food production in countries with rapid population growth and, as the nation with the largest food consumption and largest food surpluses, an obligation to contribute to alleviating famine when it occurs.

• At the special assembly session this year, the United Nations began to organize means of dealing with global raw-materials problems. For the most part, however, production, marketing, and consumption of such materials continue to be unplanned and unregulated, leaving producers and consumers alike at the mercy of ups and downs in supply and price and risking widespread economic disaster and rapid depletion of exhaustible resources. Such problems can be effectively met only by international agreements and agencies in which all or most nations participate, such as those the United Nations can provide.

• Substantial increments to essential world supplies may be found in the sea and seabeds. At the same time, unrestricted national competition to exploit these resources could lead both to their early depletion and to serious international conflicts. This year the United Nations held a conference on the Law of the Sea, which will be continued next year. Progress so far has been extremely disappointing, partly because of a lapse of leadership on our part. It is in our national interest to do all in our power to ensure that the conference next year succeeds.

• The world monetary system is in great disarray. There is no present assurance that it can cope with the strains produced by global inflation and the spiraling prices of fuel and other materials. Common action in and through the International Monetary Fund offers the best prospect of avoiding widespread economic slowdown and depression.

• It will be impossible to obtain the cooperation of the underdeveloped countries in resolving problems of population, food, and raw materials unless the rich countries contribute more substantially to their economic development. The experience of 25 years has shown that this contribution can be made with less political involvement and embarrassment through multilateral programs. The United States should direct an expanding proportion and volume of development assistance through such U.N. agencies as the World Bank and its affiliates, the regional-development banks, the U.N. Development Program, and the relevant U.N. agencies.

• Mankind has only just learned that its environment is not indestructible and that irreversible damage to it is already occurring. Because much of the environment is international, its protection also must be. At the Stockholm Conference in 1972, the United Nations established an Environmental Program, which monitors emerging dangers to the international environment, advises governments what is occurring, and assists them in preventive action. This program deserves strong U.S. support.

What is the cost of such a program to the United States and others? The total annual budget of the United Nations and its whole family of agencies is only $1.3 billion, less than half of 1 percent of the U.S. budget, no more than the cost of a single Trident submarine. The U.S. contribution to the total U.N. budget is approximately $400 million, less than half the cost of maintaining the New York City police. This cost would hardly seem extravagant for an organization with these vast responsibilities, which Adlai Stevenson called "the last best hope of mankind."

WE LIVE in a world of nations that are politically independent but otherwise more and more dependent on each other, in many cases for security and even survival, in all cases for economic stability and progress.

Under these circumstances a strong international organization, capable of peacemaking, peacekeeping, and control of armaments, equipped to deal with global economic and environmental problems, is more and more indispensable, more and more in the national interest of every nation.

Such an international organization, the United Nations, has existed for nearly 30 years, but its full capacities have never been fully utilized.

There are many ways in which the United Nations can and should be improved, but it cannot be improved if it is neglected. If the United States reasserts the role of leadership that it exercised for the first two decades of the United Nations' existence, we can initiate the reforms we consider desirable. If we do not lead, others will—and not necessarily along lines we would wish. □

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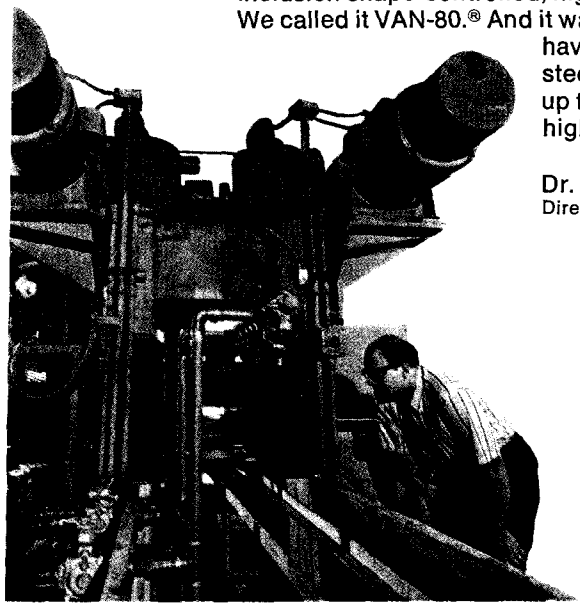

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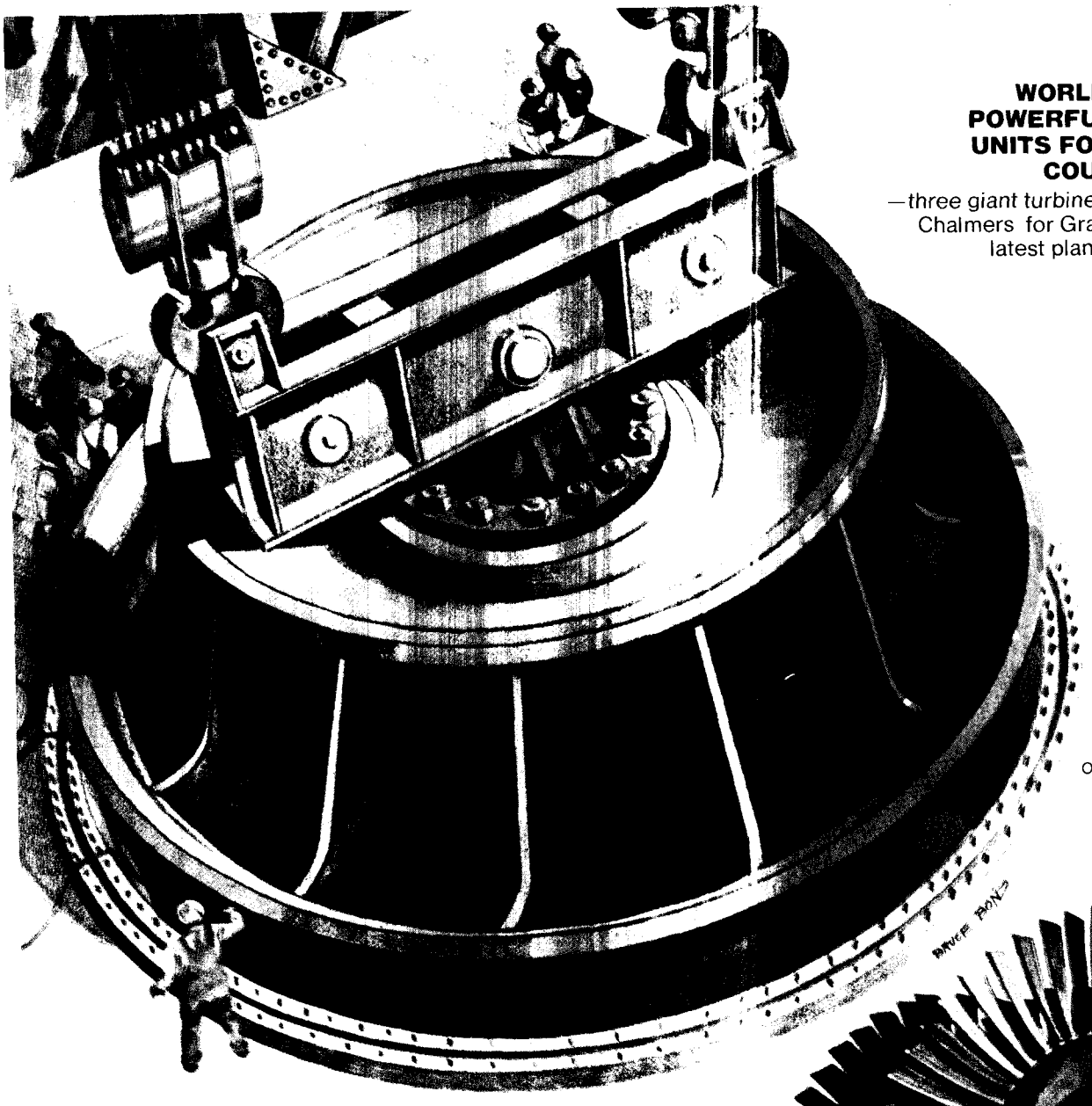

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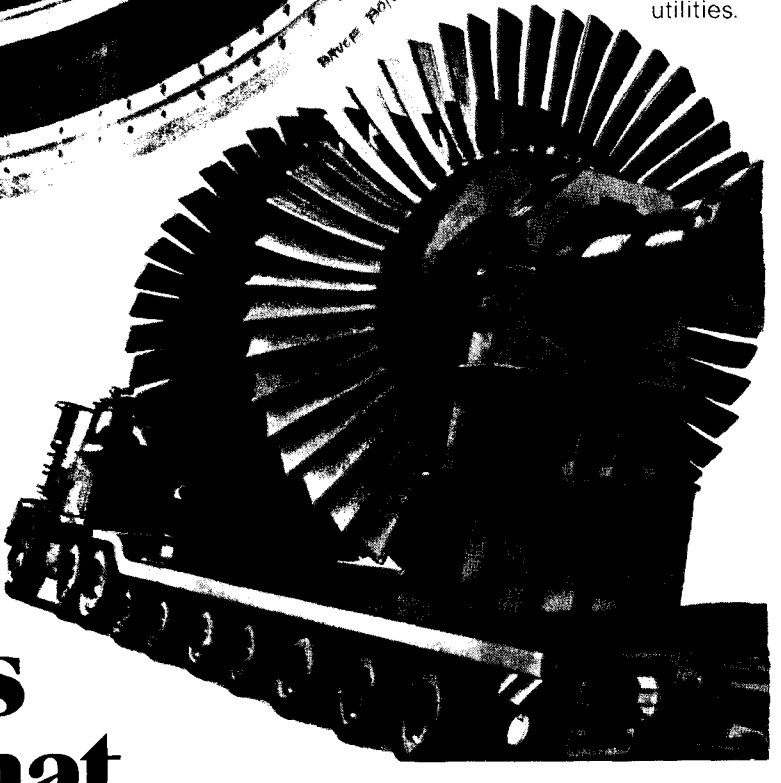

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John Adams | Clifford Alexander, Jr. | Jerry Apodaca | Christopher Bond | Norman Bowie

FUTURE PROMISE

The real hope for tomorrow may well rest with these and other young Americans unusually gifted in law, politics, science, journalism, commerce, and the arts.

John Adams, 37, minority counsel, U.S. Senate, is known in Washington, D.C., as an ombudsman for the small-business community in general and for minority business in particular. He is currently redrafting, and pushing for hearings on, the Javits/McIntyre proposal for a bank that would provide loans to private business in depressed areas.

Clifford Alexander, Jr., 41, was a special consultant to President Johnson on civil rights and chairman of the Equal Employment Opportunity Commission, but he has not restricted his talents to black issues; he has also served as foreign-affairs officer of the National Security Council and director of a program that was forerunner to the federal Anti-Poverty Program. Alexander is currently on the board of directors for both the Mexican-American, and the NAACP, Legal Defense and Educational funds.

Jerry Apodaca, 40, is the first governor with a Spanish surname to be elected since 1921. Democratic colleagues in New Mexico were originally leery of the state senator's Hispanic background, but his heritage, it is said, served him well at the polls in November.

Christopher Bond, 35, inaugurated as governor of Missouri in 1973, became the youngest governor in the nation—and the youngest in Missouri's history. A steadfast believer in strong state government, he is beginning to win over even those "who for years have advocated the nostrum of federal dollars for every ailment."

Norman Bowie, 32, executive secretary of the American Philosophical Association, has turned his organization around to face its more corporeal responsibilities. At his insistence, the association is now trying to incorporate the techniques of reasoning into all levels of schooling, including the elementary grades; assisting young scholars in job hunts; and encouraging minorities to choose philosophy as a career.

José Cabranes, 34, is special counsel to the governor of the Commonwealth of Puerto Rico, in Washington, D.C. Cabranes also serves as a trustee of the U.S. Institute of Human Rights. He is former associate professor of law at Rutgers and a firm believer in greater autonomy for Puerto Rico.

Thomas J. Downey, 25, defeated a six-term Republican incumbent in the November congressional races in New York. He will be the youngest representative in the Ninety-fourth Congress—slipping under the wire with the minimum age requirement.

Renée DuJean, 36, is director of the National Urban League's Black Executive Exchange Program. She sends executives from more than 450 participating companies to various campuses, with the stated purpose of educating students in career fields. Miss DuJean herself, however, is more explicit: "We raise the ceiling on black students' aspirations."

Eugene Fodor, 24, the violinist, is the only string player in the Western world to take highest honors in Moscow's Tchaikovsky International Competition—a feat he performed last July. The critical acclaim was perhaps most tumultuous this time, but Fodor has long been accustomed to accepting kudos: He took first prize in the Paganini Competition at age 22 and made his debut with the Denver Symphony Orchestra when he was 11.

Wyche Fowler, Jr., 34, is president of Atlanta's City Council and has been active in city government since his election as alderman five

José Cabranes | Thomas J. Downey | Renée DuJean | Eugene Fodor | Wyche Fowler, Jr.

Jerry Glenn | Allan Goldstein | Thomas D. Heekin | James Hoge | Elizabeth Holtzman

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Amaziah Howell

Barbara Jordan

Alice Tepper Marlin

Garrick Ohlsson

D. Kenneth Patton

Paul Pendorf

Joe Raposo

Henry Ruth, Jr.

Carl Sagan

years ago. Included in the legislation he has authored and seen passed are an ordinance banning closed-door government sessions and an act combating drug pushing. Fowler has also organized seminars for teaching 300 Atlanta-area high-school students the workings of the city's Board of Aldermen.

Jerry Glenn, 29, developed a joint T.B.-leprosy control program—on a zero budget—in Malawi and then returned to the States to work on a plan for incorporating long-range forecasting techniques into teaching methods, creating the Consortium for Futures in Education. Now a confirmed futurist, he has accepted a post with the Committee for the Future as coordinator of SYNCON—a large-scale plan for engaging the public in making long-range goals.

Allan Goldstein, 37, co-discoverer of thymosin, a hormone that stimulates immunity, is now helping to guide that discovery from conception to possible application: Tests have begun on two patients with terminal cancer. Director of the biochemistry division at the University of Texas Medical Branch, Dr. Goldstein says that the hormone will next be applied only as supplementary therapy in cancer, but he expects it to be "immediately effective in producing defense against the overwhelming infections which account for some 40 percent of deaths in cancer patients."

Thomas D. Heekin, 37, of Glendale, Ohio, is the nation's youngest municipal judge. With five years' experience in the judicial system, Judge Heekin is convinced that "our courts will be in trouble until society adjusts its priorities and allocates to them the necessary human and material resources."

James Hoge, 38, editor of the *Chicago Sun-Times,* joined the staff in 1958. After an interim stay in Washington, studying government and reporting for the Washington bureau, Hoge returned to Chicago and worked his way to the chief editor's spot in less than four years. A graduate of Yale, in political science, and of the University of Chicago, in modern history, Hoge is keenly sensitive to the social responsibilities of what he calls his home—the press.

Elizabeth Holtzman, 33, U.S. representative, is known mostly for the searching interrogation she conducted during the Judiciary Committee's pardon probe; but she has had a long-standing reputation for making, and meeting, challenges. In 1972 the Brooklyn Democrat unseated Rep. Emanuel Celler, a 50-year incumbent. She has since proposed legislation, adopted by the House, that speeds federal grants for crime fighting and ends the CIA's domestic use of Law Enforcement Assistance funds.

Amaziah Howell, 26, is employed as staff assistant for Sen. James Buckley but is more aptly described as Mr. Civic Servant. He is presently director of both the United Future Opportunities for Youth and the Foundation for Research and Education in Sickle Cell Diseases; he sits on advisory boards and committees for seven organizations, including the March of Dimes, and has affiliations with nine other altruistic groups.

Barbara Jordan, 38, U.S. representative and a member of the House Judiciary Committee, in her 1966 legislative victory became the first black elected to the Texas senate. Unanimously elected senate president pro tempore in 1972, she became the first black woman governor in U.S. history at the traditional Governor for a Day ceremonies.

Alice Tepper Marlin, 30, founded the Council on Economic Priorities—a non-profit company that analyzes corporate good citizenship and publishes its results. Although the reports are more statistical than activist, Mrs. Marlin is certain that the results are telling—and that people will "put their money where their morality is." Ford, Mobil, Dow Chemical, and Ralph Nader evidently agree—they've all been on the subscription list.

Garrick Ohlsson, 26, is the only American to win the prestigious Chopin International Piano Competition. With that prize, he established himself not only as a leading attraction on the concert circuit but also as one of the greatest American pianists today. Ohlsson has also claimed Italy's Busoni Prize and Montreal's International Piano Competition and has performed under conductors Eugene Ormandy, Seiji Ozawa, and Stanislaw Skrowaczewski.

D. Kenneth Patton, 43, president of the Real Estate Board of New York, "sells" his city—yet still maintains a responsible stance for his industry in civic affairs. He was previously administrator of New York's Economic Development Council, where he initiated the first urban industrial parks network, which has since attracted more than $100 million in private investment and will create 60,000 jobs.

Paul Pendorf, 34, currently heading a Pfizer, Inc., subsidiary in Copenhagen, was recently given The Bronze Award by the U.S. government for his work on the Presidential Executive Interchange Program. Sent by Pfizer to captain the Project Safeguard Program, Pendorf—with his 600-person staff—was successful in preventing the buildup of toxic organic phosphates, which had been expected after the EPA banned D.D.T.

Joe Raposo, 35, is best known for composing Sesame Street songs. Once called "The Willie Mays of Music," Raposo has touched all bases. He has composed, arranged, or conducted for numerous hits on and off Broadway, including *Half a Sixpence* and Brecht's *A Man's a Man.* Until 1974 Raposo was musical director of and composer/lyricist for the Children's Television Workshop, where his songs earned him both an Emmy and a Grammy.

Henry Ruth, Jr., 43, Watergate special prosecutor, had a predecessor who once said the job could bring drastic changes to a life-style; Ruth, however, took the post intending to bring changes to the courtroom instead—and to uncover the full Watergate story. The third man to take this office, Ruth has served as director of the National Institute of Law Enforcement and Criminal Justice, and the Mayor's Criminal Justice Coordinating Council in New York City.

Carl Sagan, 40, has impressive achievements as educator, author, and editor; his astrophysical revelations, however, verge on the awesome. His research deals principally with planetary surfaces, space-vehicle exploration of the planets, the origin of life on earth, and the possibility of extraterrestrial life. Director of planetary studies at Cornell University, Dr. Sagan is also active in the U.S. astronaut-training program.

Nicholas Scoppetta, 41, New York's Commis-

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Nicholas Scoppetta | Robert Shleser | Arthur Taylor | Howard Temin

Kip Thorne | Judith Thoyer | Steven Weinberg | Kenneth Wilson

sioner of Investigation, is responsible for raking out corruption from the city's government—and has not even stopped at arresting commissioners of other city agencies. "We in public life must make new demands on ourselves," he says, "and the public, too, must take responsibility to ensure that its desires are met."

Robert Shleser, 35, assistant professor of food sciences and technology at the University of California, coordinates a project at the Bodega Marine Laboratory that combines engineering, genetic, and physiological expertise in an effort to farm profitable—and nutritional—food from our seas.

Arthur Taylor, 39, president of CBS, is encouraged by his company's narrowing vision—a vision that focuses concern on the individual's accomplishments and "puts satisfaction back into the corporate process." Taylor's own accomplishments have a wide range: He is trustee of Brown University, a member of the Council on Foreign Relations, and a director of the Japan Society, Inc.

Howard Temin, 40, was one of this year's winners of the Lasker Award—the most important prize in American medicine. He revolutionized that part of molecular biology that has to do with cancer viruses by discovering a relationship between the genetic material DNA and viral RNA.

Kip Thorne, 34, professor of theoretical physics at the California Institute of Technology, is noted for combining skills as philosopher, physicist, and author to entrance his audiences—and to win the AIP–U.S. Steel Foundation Science Writing Award in Physics and Astronomy. He has served as Fulbright Lecturer in France and visiting professor, Moscow University.

Judith Thoyer, 34, was recently elected a partner of Paul, Weiss, Rifkind, Wharton, & Garrison. She was once a law librarian at the University of Ghana and later an editor of the *Columbia Law Review*. Her legal interest is business law; her personal interest, women in business and law. As more women become active in these fields, she says, they will be neither "ignored when they are deserving, nor rewarded when they are not. This is the equality we can hope for."

Steven Weinberg, 41, a theoretical physicist, is a Higgins Professor of Physics at Harvard and a senior scientist at the Smithsonian Astrophysical Observatory. Among the works for which he is best known is the development of a theory that unifies two of the four basic kinds of forces that act on the elementary particles—the so-called weak and electromagnetic.

Kenneth Wilson, 38, winner of the Dannie Heineman Prize in Mathematical Physics, combines two areas of expertise—physics and mathematics—to extract simple physical principles from complex mathematical constructions. He is presently James A. Weeks Professor of Physics at Cornell.

—COMPILED BY SUSAN SCHIEFELBEIN

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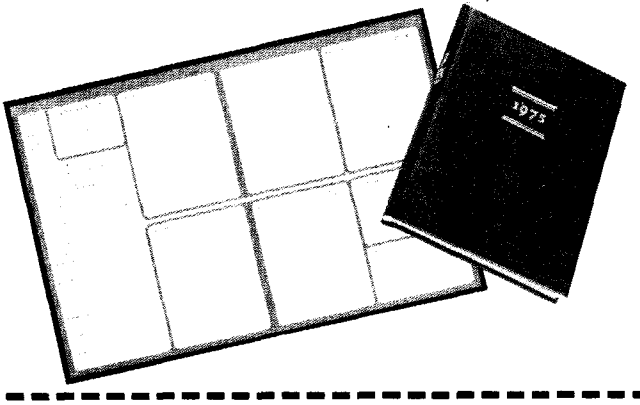

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IN SUPPORT OF HUMANKINI

Global Solutions

In general, the strategies for solution of the crisis in world development demonstrate the necessity for organic growth of the world system. Indeed, that appears to be the only way to prevent major regional, if not global, catastrophes. . . .

What are the immediate first steps which could be taken on a social or individual basis and which can create an atmosphere in which serious attempts to develop master plans for organic growth can be undertaken? On the societal level the necessary changes include:

• The realization that counterproductivity will be the ultimate consequence of any action confined solely to short-term considerations. . . .

• The futility of narrow nationalism must be appreciated and taken as an axiom in the decision-making framework. . . .

• Development of a practical international framework in which the cooperation essential for the emergence of a new mankind on an organic growth path will become a matter of necessity rather than being left to good will and preference. . . .

• Realization of the overriding importance of the long-term global development crises . . . and willingness to place this highest on the agenda of the issues to be dealt with explicitly by national governments and international organizations. . . . Future history will not focus on personality and social classes, as has been characteristic of history in the past, but on the use of resources and survival of the human species. . . .

—Mankind at the Turning Point: The Second Report to The Club of Rome, *by Mihajlo Mesarovic and Eduard Pestel (Dutton/Reader's Digest Press). © 1974 by the authors.*

Directing Growth

The anti-growth movement and its accompanying excessive concern with the environment not merely leads to a regressive change in the distribution of resources in the community; it also distracts attention from the real issues of choice that society has to face. . . .

Large sections of the community are still not adequately provided with the conventional necessities of modern conditions of living, and economic growth needs to be maintained as a necessary, though by no means sufficient, condition for improving the standards of living of the vast mass of the world's population. . . .

Those of us who are confident that society will continue to find the means and the technology to overcome the problems of pollution, to increase food supplies, to reduce birth rates, and to find raw materials or synthetic materials, and so on, are invariably accused of being "Micawbers" and myopic or complacent optimists, but our predictions are firmly based on a study of the way these problems have been overcome in the past. . . .

It is particularly absurd to assume that societies will be too timid to enforce pollution-abatement technologies on industry but will be bold enough to carry out the vast political and social transformations that zero growth would require. . . .

The middle-class obsession with certain aspects of the environment must not be allowed to divert attention from more serious allocation problems. These include, first, the distribution of income, both internationally and within countries. They also include major problems such as those of education, housing, health services, and working conditions, and in the poorer countries they include even more basic ingredients of life. So, as Anthony Crosland [in "Pollution—or Poverty," *The (London) Sunday Times,* June 26, 1972] has put it, "we can move away from the recent sterile argument of growth versus anti-growth and resume the real argument. How do we use and direct our growth?"

—Two Cheers for the Affluent Society: A Spirited Defense of Economic Growth, *by Wilfred Beckerman. To be published in March by St. Martin's Press. © 1974 by the author.*

Population

The need to stabilize population sooner rather than later must not be viewed in isolation, but as part of a broader effort to create a workable world order. Such an effort must not only strive to slow population growth as rapidly as possible, but it must also seek to arrest the pursuit of superaffluence. An indefinite increase in either the number of people in the world or in the amount of goods and services consumed by each individual would eventually put unbearable stress on the earth's ecosystem and resources. If the developed countries continue the pursuit of superaffluence as they have so successfully over the past quarter century, then the world will be threatened as surely as if its population had multiplied several times. . . .

If uncontrolled human fertility poses a greater threat to our future well-being than any other single factor, as many informed analysts now believe, then national governments must rethink the question of national security and the allocation of budgetary and human resources. At present, expenditures on the direct control of fertility worldwide total perhaps $3 billion per year. This compares with global military expenditures far in excess of $200 billion per year, exceeding the income of the poorest half of mankind. The question is whether leaders at the national level can perceive the changing nature of the threat to national security and well-being soon enough to achieve a more rational ordering of priorities before major global problems become unmanageable.

—In the Human Interest, *by Lester R. Brown (Norton). © 1974 by the publisher.*

Food Production

One of the principal keys to future food-production prospects is the combination of technology from the industrial countries with the capital and flared natural gas of the Middle East to produce abundant supplies of moderately priced fertilizer. The Middle East has the raw materials and the capital to become the dominant supplier of comparatively cheap nitrogen fertilizer for the rest of the world. Whether or not it will do so depends very much on international political relationships. Probably no other single factor can affect food-production prospects over the next decade as much as the outcome of this question. . . .

There is still a very substantial potential for raising yields in many developing countries, assuming that the requisite inputs of water, energy, and fertilizer are available to realize this potential. The new high-yielding dwarf wheats and rices underlying the Green Revolution are early maturing and have more flexible planting dates, thus expanding the opportunity for multiple cropping (again, as-

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Sampler of New Books

suming that additional inputs are forthcoming). New opportunities may also exist for double cropping in temperate-zone countries. Historically, little attention has been paid to this potential, simply because overproduction has been a problem in the past generation, during which the technology, especially the intensive use of chemical fertilizer, has made double cropping feasible. With food supplies now much tighter, the combination of a winter grain crop such as wheat and a summer crop such as soybeans could become an important source of additional output in the immediate future in such locales as the southern portion of the U.S. corn belt.

Also on the hopeful side is the fact that some governments have demonstrated that they *can* achieve rapid gains in food output. We know that farmers respond to economic incentives. Some governments have also demonstrated that they can put the brakes on population growth. A handful of developing countries, possibly including China, have already matched the remarkable reduction in birth rates in Japan between 1948 and 1955.

—By Bread Alone, *by Lester R. Brown with Erik P. Eckholm (Praeger). © 1974 by The Overseas Development Council.*

Satellite Watch

Laden with cameras capable of ultra-high resolution and with sensitive measuring instrumentation, spacecraft in orbit several hundred miles up can take the earth's pulse electronically. They see what man cannot. Not only can they survey and inventory the world's resources more economically and effectively than ever before, but they can also detect elusive clues that will lead man to new supply sources. The potential applications of such satellites are virtually limitless. . . .

Prospecting from space will permit charting of known resource areas and discovery of new ones in remote areas. While it is impossible for them actually to detect minerals, space satellites can help locate areas that look promising because of their large structural features. Geologists can then investigate those areas further from the ground or through aerial photography. . . .

Through the use of ultraviolet techniques, spaceborne instrumentation may aid in the finding of phosphate "glows" in remote areas of the world, betraying the location of such deposits and helping solve the need for fertilizer in nations where food supplies are short. . . .

Infrared instruments from orbital platforms can be used to trace the temperature outlines of ocean currents and upwellings, and can help lead man to one of his major food supplies—fish. Surface temperatures can help identify the highest plankton concentrations—the prime source of food for fish. In early experiments satellites have proved that this can be done by leading Taiwan fishermen to an area previously undiscovered, but teeming with edible marine life.

—For All Mankind: America's Space Programs of the 1970s and Beyond, *by L. B. Taylor, Jr. (Dutton). © 1974 by the author.*

Energy Options

The failure in the past decade to push ahead on [the development of new energy technologies] . . . except for nuclear energy, is at the heart of the problems we now face. There are few quick fixes and many of the basic new sources may take decades to perfect. Even so, a significant number of promising technical options could be perfected within the next 10 to 15 years.

Large quantities of commercial energy would be forthcoming in 1985 and beyond if the nation committed the funds and provided strong leadership to do the job. By 1984 we could develop:

• New automated underground coal-mining systems that would be relatively safe and economical as well.

• Commercial plants for gasification of coal to supplement natural gas as a fuel.

• Commercial plants for converting coal to oil.

• A commercial shale-oil industry producing 1 million barrels per day.

• Commercial geothermal energy providing significant quantities of electric power production in the West and perhaps elsewhere. . . .

• The commercial use of solar energy for direct heating and cooling of homes in many parts of the nation.

• An electric automobile for suburban use in conjunction with mass transit to use electric energy for transportation and thus reduce the need for importing oil. . . .

The nation must make a commitment to developing solar energy, a commercial fuel cell, geothermal power, and many other promising ideas. A first step would be the creation of an Energy Research and Development Agency. The President has pledged a $10 billion effort over the next five years, and Congress is considering a $20 billion effort. But unless a new agency brings fresh talent with a sense of commitment to the job, this money could go down the drain. Without new leadership the existing sources of energy will consume the money. The new agency must be the champion of the clean energy options that have no commercial sponsor—the sun, geothermal energy, and new technology to use energy more efficiently.

—Energy: The New Era, *by S. David Freeman (Walker, cloth; Vintage, paper). © 1974 by The Twentieth Century Fund.*

Energy Savings and Supplies

It is desirable, technically feasible, and economical to reduce the rate of energy growth in the years ahead, at least to the levels of a long-term average of about 2 percent annually. . . .

The most substantial energy savings could be achieved through the pursuit of four goals:

• Setting prices to eliminate promotional discounts and reflect the full costs of producing energy—especially important in achieving industrial energy conservation goals;

• Adopting national policies to assure the manufacture and purchase of more efficient automobiles;

• Developing incentives for increased energy efficiency in space conditioning of buildings;

• Initiating government programs to

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spur technological innovation in energy conservation. . . .

During the next decade, new [energy] supplies would come from the following sources:

• New discoveries of oil and natural gas in the lower 48 states and Alaska onshore, and offshore in the Gulf of Mexico;

• Coal from deep mines and areas where surface mining reclamation is feasible;

• Electric power plants that are already in some stage of construction;

• Secondary and tertiary recovery of oil and gas from existing wells.

The development of these supplies will not prevent shortages in the very short term because of the lead times involved in any new developments. But if no effort is made to improve efficiency in energy consumption, any near-term shortages would be worse.

—A Time to Choose: America's Energy Future, *the Final Report by the Energy Policy Project of the Ford Foundation (Ballinger Publishing Co.). © 1974 by the Ford Foundation.*

Energy Conservation

Across-the-board reforms in pricing policies for gas and electricity would be one of the most effective—and least disruptive—means of promoting the large-scale conservation of our energy supplies.

Similarly, the repeal of the many tax statutes, subsidy arrangements, and regulations which encourage the inefficient use of energy and favor the most profligate segments of U.S. industry would give a powerful impetus to conservation. Energy efficiency must take precedence. The big tax breaks and subsidies should go to those industries, technologies, and national programs which are helping the country eliminate waste and become more economical in its use of energy. . . .

The worst mistake that could be made would be to cling to the status quo. A conservation-oriented economy will provide a wider range of jobs that are more fulfilling to individual workers. An employment increase in service industries and a greater demand for highly skilled craftsmen should be good news. It will mean a shorter work week, working environments that are less dehumanizing, and a dramatic increase in opportunities for individual creativity. . . .

—The Energy Balloon, *by Stewart L. Udall, Charles N. Conconi, and David E. Osterhout (McGraw-Hill). © 1974 by the authors.*

Nature's Energy

The attempt to get more synthetic fuel from high-energy agriculture might be successful, but only at the expense of the natural biological system itself. We must rob Peter to pay Paul. Instead of making natural gas from the wastes, the wastes themselves might be used more wisely—for natural fertilizer. . . .

Instead of trying to achieve the impossible—i.e., force the natural system into the technological mold—the technological mold must be fitted back into the biological system. The contest is not whether we can create synthetic natural gas, but whether we can decentralize agriculture and recycle resources. That is the promise of solar bioconversion—the ability to recycle resources, which includes making better use of energy resources. The additional energy wrested from the wastes of a city might be used for fuel conversion to run some of the city's systems, but it can never be more than a supplement to the energy demands of the city. The energy needs of the feedlots might be supplemented by utilizing the organic wastes of the confined animals for fuel, but an infinitely better solution is to decentralize the feedlot-agribusiness system and begin the return to a more natural biological cycle.

—Energy for Survival, *by Wilson Clark (Anchor Books). © 1974 by the author.*

A Moral Revolution

A continuing moral revolution accompanying technological change will no doubt accelerate the stresses involved in discovering new values and meanings in our existence. It will have continuing repercussions—in our social life, in our educational system, the nature of marriage and the family, political and economic institutions.

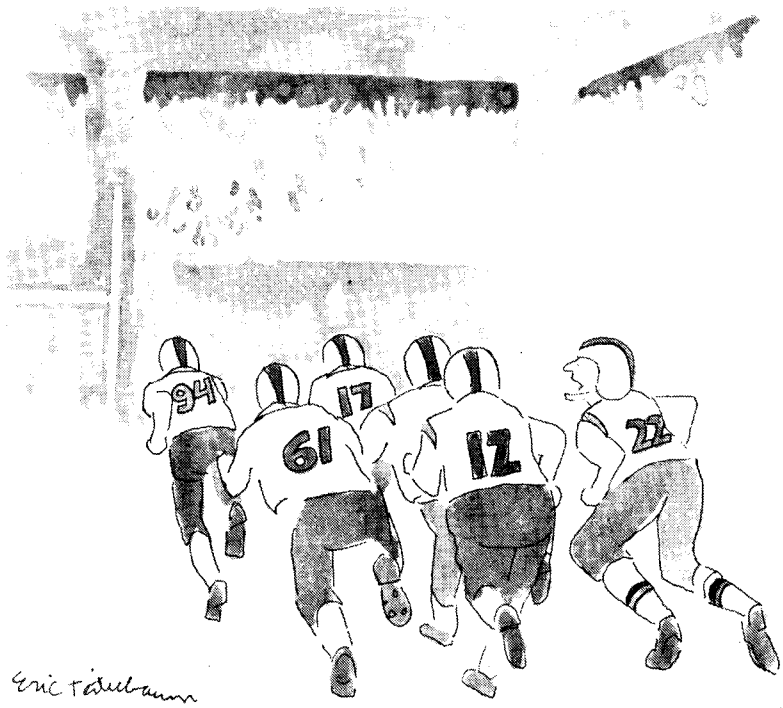
Our basic problem is moral: to survive and to live well, and to be a conscious member of the family of man, aware that we are all linked in humanity, and thus able to utilize the instruments of science, technology, and the arts of society for universally worthwhile purposes.

In this approach to the future, the qualities that man needs to foster if he is to survive are critical intelligence, compassion, and courage—qualities he should never be willing to barter for vain promises. Man, the primate with the enlarged cerebral cortex and the ability to respond to symbols and use language, needs critical intelligence for his survival, his needs and functions, and his exploration of new forms of his life-adventure. . . . The moral point of view is a prerequisite for human survival. . . .

—The Fullness of Life, by *Dr. Paul Kurtz (Horizon Press). © 1974 by the author.*

An Old Vision

I think there is an old vision, though it is not very old compared with the age



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of the human race. I am thinking of the vision of the founders of the great religions. I am thinking of—putting the names in a chronological order—the Buddha in India, Lao Tse in China, Jesus in Palestine and one Westerner, Saint Francis of Assisi. Just one Westerner! But Saint Francis is very important for us because he was a Westerner. He is an example that we ought to pay attention to and try to follow.

These religious founders disagreed with each other in their pictures of what is the nature of the universe, the nature of spiritual life, the nature of ultimate spiritual reality. But they all agreed in their ethical precepts. They all agreed that the pursuit of material wealth is a wrong aim. We should aim only at the minimum wealth needed to maintain life; and our main aim should be spiritual. They all said with one voice that if we made material wealth our paramount aim, this would lead to disaster. They all spoke in favor of unselfishness and of love for other people as the key to happiness and to success in human affairs. They all personally renounced material wealth and power. . . .

Now, what we have to do, to try to do, is to make a spiritual revolution. . . . —On Growth, *edited by Willem L. Oltmans, selection by Arnold Toynbee (Putnam). © 1974 by the editor.*

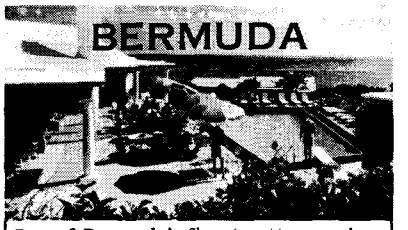
Social Justice

Is there any hope for man? . . . One can be optimistic, I believe, only if this generation—the young particularly—can shuck off the madness of the nightmare that man for centuries, and increasingly of late, has been living. A new vision is needed if man is to create on earth the beauty that this planet manifests from afar. The vision must be one of social justice, of the interdependence of all mankind. Unless the equality, the oneness, and the common dignity of mankind pervade the vision, the only future of this planet is violence and destruction on an ever increasing scale—a crescendo of inhumanity that can only result in total destruction. . . .

I believe that none but the young—and the young in heart—can dream this vision or pursue this ideal, for it means leaving behind the conventional wisdom that pervades the aging bones of the Western world.

—The Humane Imperative, *by Theodore M. Hesburgh, C.S.C. (Yale University Press). © 1974 by Yale University.*

—COMPILED BY SUSAN HEATH



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Robert Stone | Tom McHale | James Welch | Richard Price

The Young Hopefuls

Writers nominated by their publishers as most likely to become tomorrow's literary luminaries.

Robert Stone, 37, won a Houghton Mifflin Fellowship for his first novel, *A Hall of Mirrors*, and was awarded a Guggenheim Fellowship in 1970. In his second novel, *Dog Soldiers*, he renders real experience with a descriptive skill that has been compared with that of Conrad and Hemingway. Mr. Stone grew up on the West Side of Manhattan, served in the U.S. Navy, and lived in the San Francisco Bay Area during the Sixties, when the counterculture was in full bloom. His fiction has appeared in *New American Review*, *Fiction*, and *The Best American Short Stories 1970*. He worked in South Vietnam during 1971 and has written about aspects of the war for *The Atlantic* and *The Guardian*.

Tom McHale has been nominated for the National Book Award for fiction and is a Guggenheim Fellow for 1974. He has written three novels—*Retreat* (1971), *Principato* (1970), and *Alinsky's Diamond* (1974). Mr. McHale, 33, was born in Scranton, Pa., and received a B.A. from Temple University and an M.F.A. from the University of Iowa. He teaches and occasionally lectures, and lives with his wife, Suzanne, in Killington, Vt., and Kittery, Me.

Ernest Brawley | Marge Piercy

James Welch is an American Indian—Blackfoot on his father's side and Gros Ventre on his mother's. But his first novel, *Winter in Blood*, is not just an "Indian novel." Although he speaks in local terms, he speaks of mankind. His first collection of poetry, *Riding the Earthboy 40*, was published in 1971. Mr. Welch, 34, attended schools on the Blackfoot and Fort Belknap reservations in Montana and then graduated from high school in Minneapolis, Minn.; he has a B.A. from the University of Montana. He has worked as a laborer, a fire fighter, and an Upward Bound counselor but now writes full time, on a farm outside Missoula, Mont.

Richard Price, 25, lived the first 18 years of his life in a Bronx housing project. His novel, *The Wanderers*, is about just that—growing up in the Bronx in the Sixties. He holds a B.S. in Industrial and Labor Relations from Cornell University. In 1972 he was a Mirillees Fellow in Creative Writing at Stanford University; he now teaches at the State University of New York at Stony Brook and is at work on his second novel.

When **Ernest Brawley** was in college, he joined his father and two uncles as a prison guard with the California Department of Corrections. He was assigned to duty on Death Row at San Quentin Prison as well as on cellblocks, gun towers, and the Main Yard. *The Rap* is a powerful fictional recreation of prison life. Mr. Brawley, 37, holds a B.A. (1962) and an M.A. (1969) from San Francisco College. He now lives in Montparnasse, Paris.

Marge Piercy is a poet and novelist whose work has been compared with Doris Lessing's. Thomas Pynchon has said that she has "the guts to go into the deepest core of herself, her time, her history, and risk more than anybody else has so far, just out

Susan Fromberg Schaeffer | Henry Bromell | Steven Kelman | Charles Johnson

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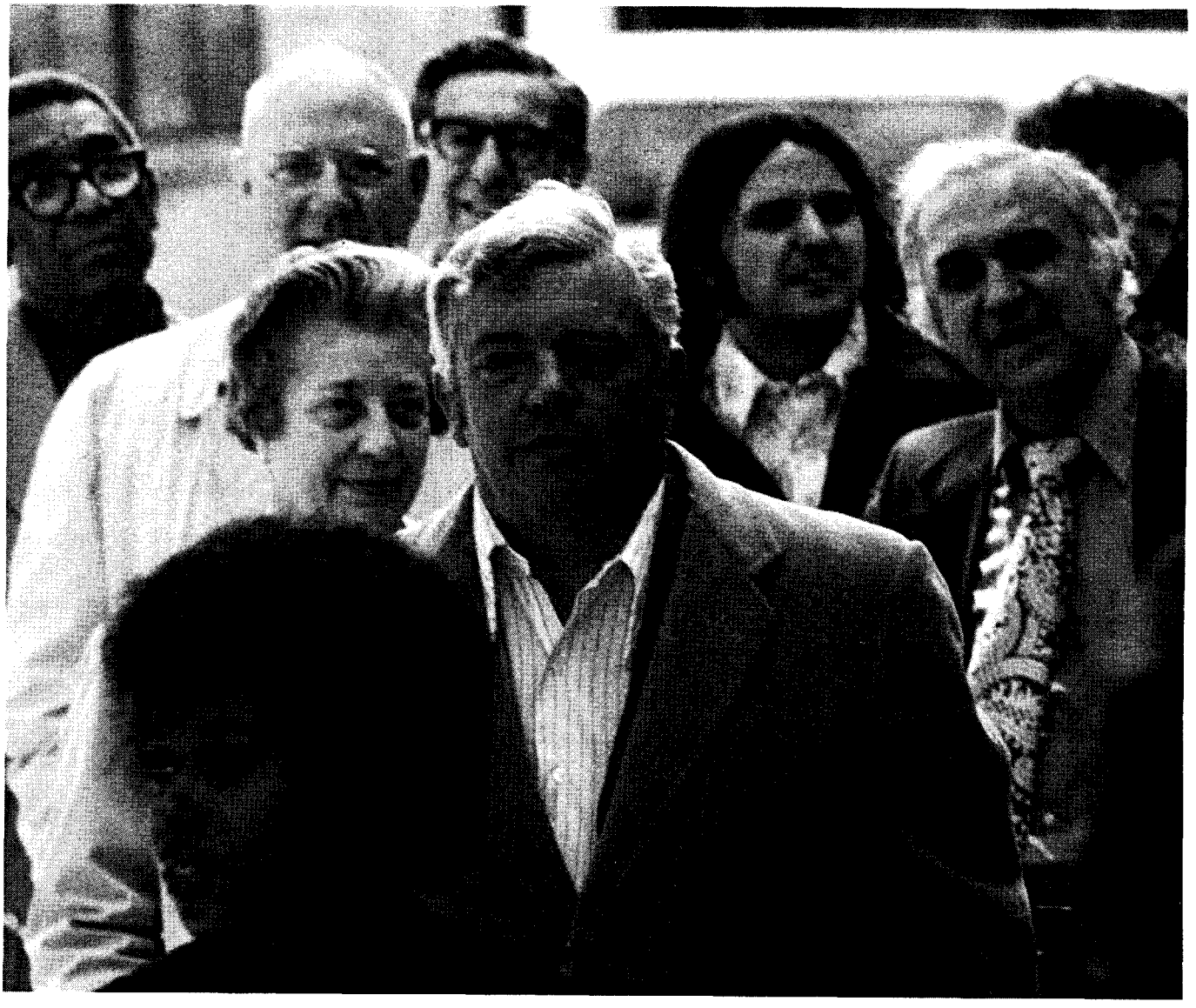

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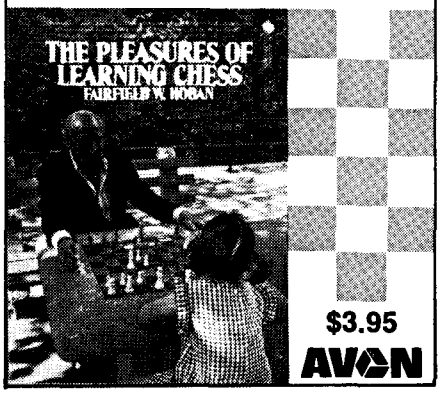

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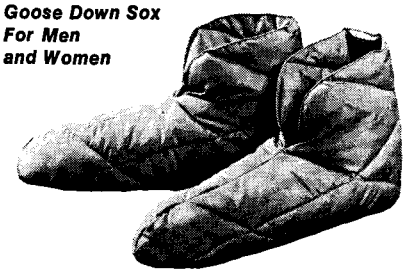

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of a love for the truth and a need to tell it." In addition to her three novels—*Going Down Fast, Dance the Eagle to Sleep,* and *Small Changes*—she has published three collections of poetry. An ex-Detroiter, she has been active in radical politics in New York and is involved in the women's movement. She lives on Cape Cod.

Susan Fromberg Schaeffer's second novel, *Anya,* is dense and vivid with the human pain suffered in wartime Poland. Her first novel, *Falling,* was published in 1973, and she has published three collections of poetry. Mrs. Schaeffer, 31, grew up in New York City and received a Ph.D. from the University of Chicago. An associate professor of English at Brooklyn College, she lives with her husband, Neil, and their young son, Benjamin.

The stories of **Henry Bromell** are written with word-perfect simplicity. All but one of the stories collected in *The Slightest Distance* (1974) appeared in *The New Yorker,* and two were published in *Prize Stories 1973: The O. Henry Awards* and *The Best American Short Stories 1973.* They won him the Houghton Mifflin Literary Fellowship. Mr. Bromell, 27, received his B.A. from Amherst College and lives in Boston.

Steven Kelman's article about the politics of high school appeared in *The New Leader* when he was a high-school sophomore. Since then, he has written for *Harper's, The New York Times Magazine, Life, Commentary,* and *The New Yorker.* After graduating from Harvard in 1970—the same year his first book, *Push Comes to Shove: The Escalation of Student Protest,* was published—he went abroad on Harvard's Sheldon Travelling Fellowship for a year and studied in Sweden on a Fulbright scholarship. His second book, *Behind the Berlin Wall: An Encounter in East Germany,* was published in 1972. Mr. Kelman is 26 years old.

Charles Johnson has a storyteller's voice. John Gardner finds it "as magical and human as the Faulkner voice." Part allegory, part satire, his first novel, *Faith and the Good Thing,* has also been compared with the work of Ishmael Reed. He is a professional cartoonist whose work has appeared in *The Chicago Tribune, Jet,* and *Ebony,* and has been collected in *Black Humor* (1970). Now 26, he is working toward his Ph.D. in philosophy at the State University of New York at Stony Brook and lives in Port Jefferson, N.Y., with his wife, Joan.

"**Dan McCall** is a writer, God help him!" —so says Tennessee Williams. Now 34, Dan McCall has written a critical study, *The Example of Richard Wright,* and two novels, *The Man Says Yes* and *Jack the Bear.* Born in California, educated at Stanford and Columbia, he received a Guggenheim Foundation grant in 1972 and is now a professor of English at Cornell. Mr. McCall and his wife, Dorothy, have a four-year-old son, Steven.

Dan McCall

Kathryn Watterson Burkhart

David Landau

Kathryn Watterson Burkhart, 32, has won national recognition for her inquiry into our system of criminal justice, and praise from Jessica Mitford for *Women in Prison,* her collection of interviews with more than 400 women prisoners. Miss Burkhart holds a B.A. in English and has received awards from the Columbia University Graduate School of Journalism, the American Bar Association, and the American Political Science Association. She lectures on urban problems and has hosted a National Educational Television special on women in prison.

David Landau, 24, is the author of *Kissinger: The Uses of Power,* which was published in 1972, the year he graduated from Harvard University, where he was

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Jeff Fields | Bob Greene | Ira Sadoff | Andrew Weil

managing editor of the *Crimson*. Since then his articles have appeared in *The Washington Post, The Los Angeles Times,* and *The Boston Globe*. He is a regular contributor to *Ramparts* and lives on the West Coast.

Jeff Fields, 36, is from the Deep South and confirms that storytelling tradition in his first novel, *A Cry of Angels*. Mr. Fields was born in Uvalda, Ga., and graduated from the University of North Carolina in 1964. According to his publisher, Jeff Fields has been "a sharecropper, grocery delivery boy, soda jerk, theater usher, projectionist, club hypnotist, Bible salesman, iron-worker, bookkeeper, water department pipe stacker, awning salesman, disc jockey, television announcer, producer." He is now a producer-host for television station WJXT in Jacksonville, Fla., where he lives with his wife and daughter.

Bob Greene, a 28-year-old columnist for the Chicago *Sun-Times*, joined the outrageous Alice Cooper band in 1973 so that he could write a book about a rock-and-roll tour: *Billion Dollar Baby*. He is also the author of *Running*, a journal of the Nixon-McGovern campaign, and has contributed articles to *The New York Times, Harper's,* and *Rolling Stone*.

Ira Sadoff's stories have appeared in *The Paris Review, Iowa Review, Transatlantic Review*. Mr. Sadoff, 29, was the co-founder and co-editor of the literary magazine *The Seneca Review*. He holds a B.S. from Cornell University and has taught at Antioch College, where he is now Writer-in-Residence. His first collection of poems, *Settling Down*, will be published in January 1975.

Andrew Weil studied mind-expanding drugs for 10 years before writing *The Natural Mind: A New Way of Looking at Drugs and the Higher Consciousness* (1972). He holds a B.A. in biology from Harvard University, where he was an editor for the *Crimson* and the *Lampoon*; in 1968 he received an M.D. from Harvard Medical School. His articles have appeared in *Look, Harper's, The New York Times Magazine, Science, Science Journal* (London), *Nature* (London), and the *New England Journal of Medicine*. Mr. Weil, 32, now holds a fellowship from the Institute of Current World Affairs. □

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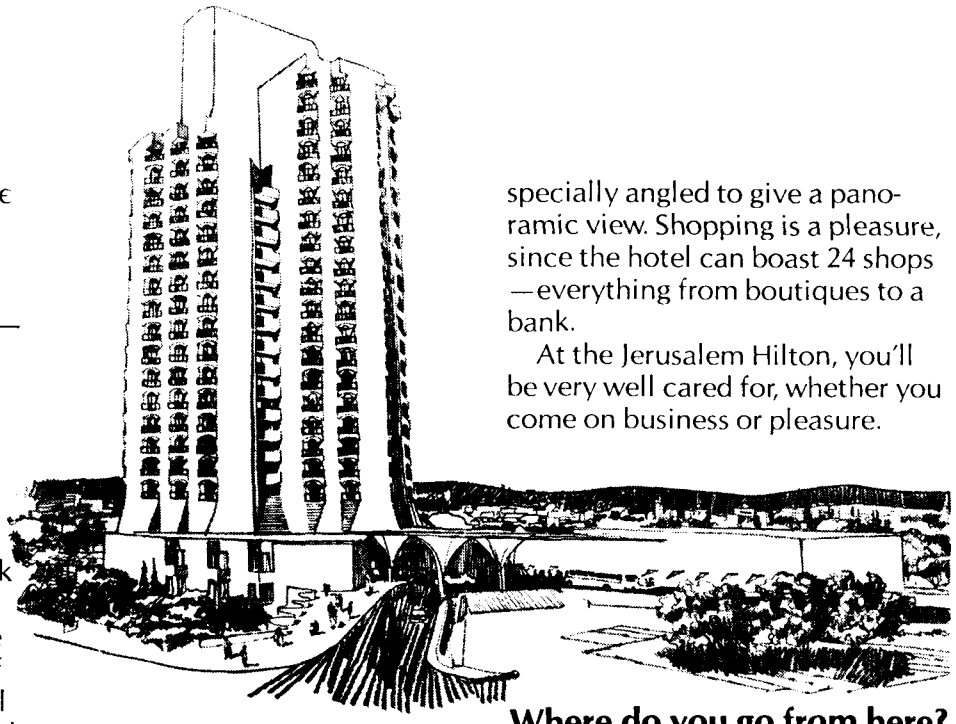

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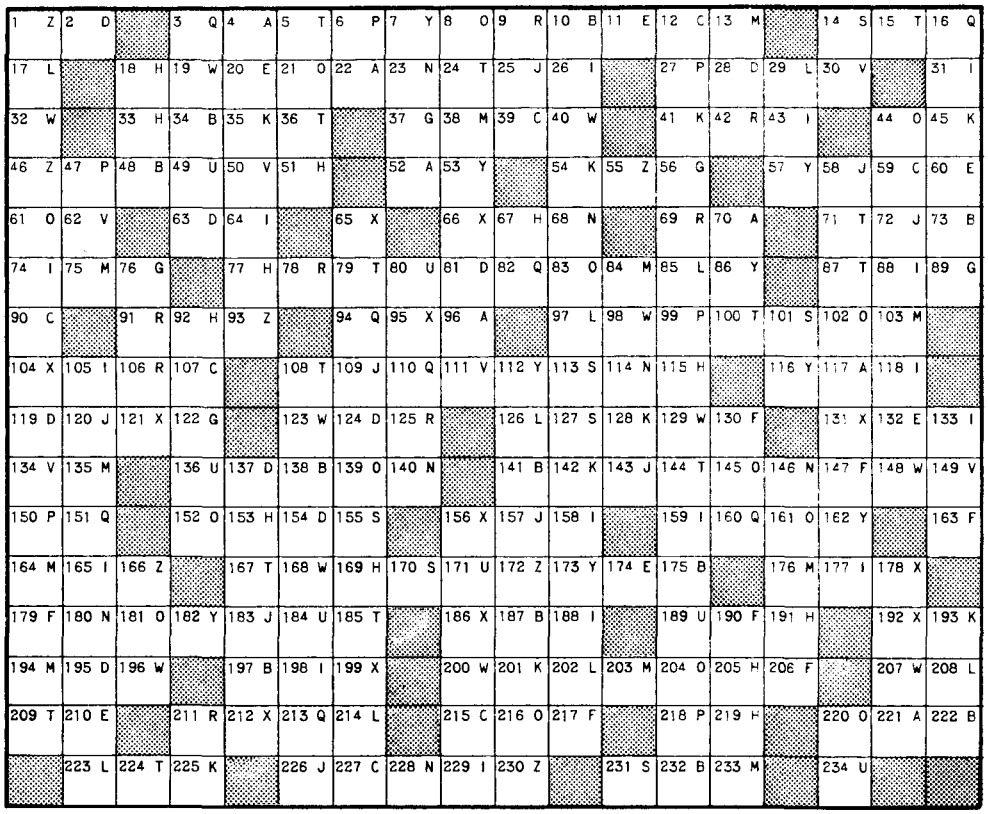
Double-Crostic No. 63

by Thomas H. Middleton



INSTRUCTIONS

If you've never solved one of these puzzles, it will probably look much more difficult than it actually is. If you can answer only a very few of the WORDS correctly, you're on your way to solving the puzzle.

Fill in the numbered blanks of all the WORDS you can guess, and write the letter of each numbered blank in its correspondingly numbered square in the diagram. The letters printed in the upper-right-hand corners of the squares indicate from what WORD a particular square's letter comes.

The diagram, when filled in, should read as a quotation from a published work. The dark squares are the spaces between words. If there is no dark square at the end of a line, a word may carry over to the line below.

The first letter of each WORD, reading down, will spell the name of the author and the title of the work from which the quotation is taken.

You should find yourself seeing words and phrases taking *form in the diagram; so you* can work back and forth, from WORDS to diagram and from diagram to WORDS, until the diagram is filled in.

CLUES	WORDS
A. Low-class, disreputable	4 52 70 221 22 96 117
B. Friar's lantern (2 wds.)	141 175 187 48 73 222 232 10 34 138 197
C. With *over*, meditating; with *out*, scolding.	215 227 12 39 59 90 107
D. Tall, malvaceous plant, *Althea rosea*	124 137 154 195 2 28 63 81 119
E. Hymn, as of praise or devotion	132 174 210 11 20 60
F. Toothed bar with which a pawl engages	130 147 163 179 190 206 217
G. U.S. lawyer, legislator, and orator (1834–1928)	37 56 76 89 122
H. Uneasy; quick to learn	153 18 33 51 77 92 115 205 219 67 169 191
I. He defeated Tilden in a disputed election (first name, init., last name)	229 165 31 88 118 133 64 105 158 188 159 177 198 26 43 74
J. Getting soft through ripening	143 157 25 58 72 226 109 120 183
K. Noctuid (2 wds.)	193 225 35 45 54 142 201 41 128
L. Disagreeable	208 223 17 29 85 97 126 202 214
M. Justly, fairly	13 75 103 164 176 203 38 194 223 84 135
N. Shakes, gives the slip	140 146 68 114 180 228 23
O. Popular drink in Trinidad, according to a song (2 wds. & comp.)	44 216 8 83 102 145 161 204 21 61 152 220 139 181
P. Ailing	218 6 27 47 99 150
Q. Collapses (2 wds.)	3 82 213 16 110 94 160 151
R. River of N.W. Wyoming, flowing into the Big Horn	91 211 9 78 42 69 106 125
S. Coruscate	127 231 101 113 14 155 170
T. German philosopher (1880–1936; full name)	224 209 87 5 36 108 185 79 144 15 71 100 24 167
U. Looks back upon	171 184 49 234 80 136 189
V. Scope	50 62 111 149 30 134
W. Prove	196 129 207 32 40 200 123 19 98 148 168
X. Inlet of the Gulf of Mexico, N.W. Florida (2 wds.)	65 131 95 104 186 192 156 121 178 66 212 199
Y. Standard of judgment	86 112 182 7 116 53 173 57 162
Z. Projects	166 46 55 93 1 230 172

Answer to *Double-Crostic No. 62* appears on page 30.

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(**McNamara:** *from page 36.*)

wealth beyond the wildest dreams of the 1 billion people in the countries with per capita incomes under $200. His caloric intake is 40 percent greater; his literacy rate is four times higher; the mortality rate of his children is 90 percent lower; and his own life expectancy is 50 percent longer. Are there any more basic terms in which to compare the wealth of the developed and developing nations?

The developed nations, understandably preoccupied with controlling inflation and searching for structural solutions to their liquidity imbalances, will be tempted to conclude that until these problems are resolved, aid considerations must simply be put aside.

But aid is not a luxury—something affordable when times are easy and superfluous when times become temporarily troublesome. It is precisely the opposite. Aid is a continuing social and moral responsibility, and its need now is greater than ever before. It is true that the affluent nations face shortages and inflation and, in order to continue to expand aid, may have to accept for the time being some selective reduction in their already immensely high standards of living. If they have to, they can absorb such inconveniences.

But for the poorest countries, such a downward adjustment is a very different matter. For them, *downward* does not mean *inconvenience,* but appalling deprivation. And for millions of individuals in these countries, *downward* means simply the risk of death.

The problem, then, is not that the developed nations have suddenly lost their capacity to assist those countries most in need. They have not. The amounts of additional financial assistance that would mean the difference between decency and utter degradation for hundreds of millions of the absolute poor are, in relative terms, minute—perhaps 2 percent of the increase in real income the developed world can look forward to in the remaining years of the decade.

The basic problem, then, is a philosophical one—a problem of values. Will 1974 be best remembered as the year prices exploded? Or will it, perhaps, be better remembered in the longer perspective of history as the year when the word *interdependence* stopped being rhetoric and started being reality? One thing is certain: The development task has not diminished. It has only become more urgent. The responsibility of us all is to get on with it. □

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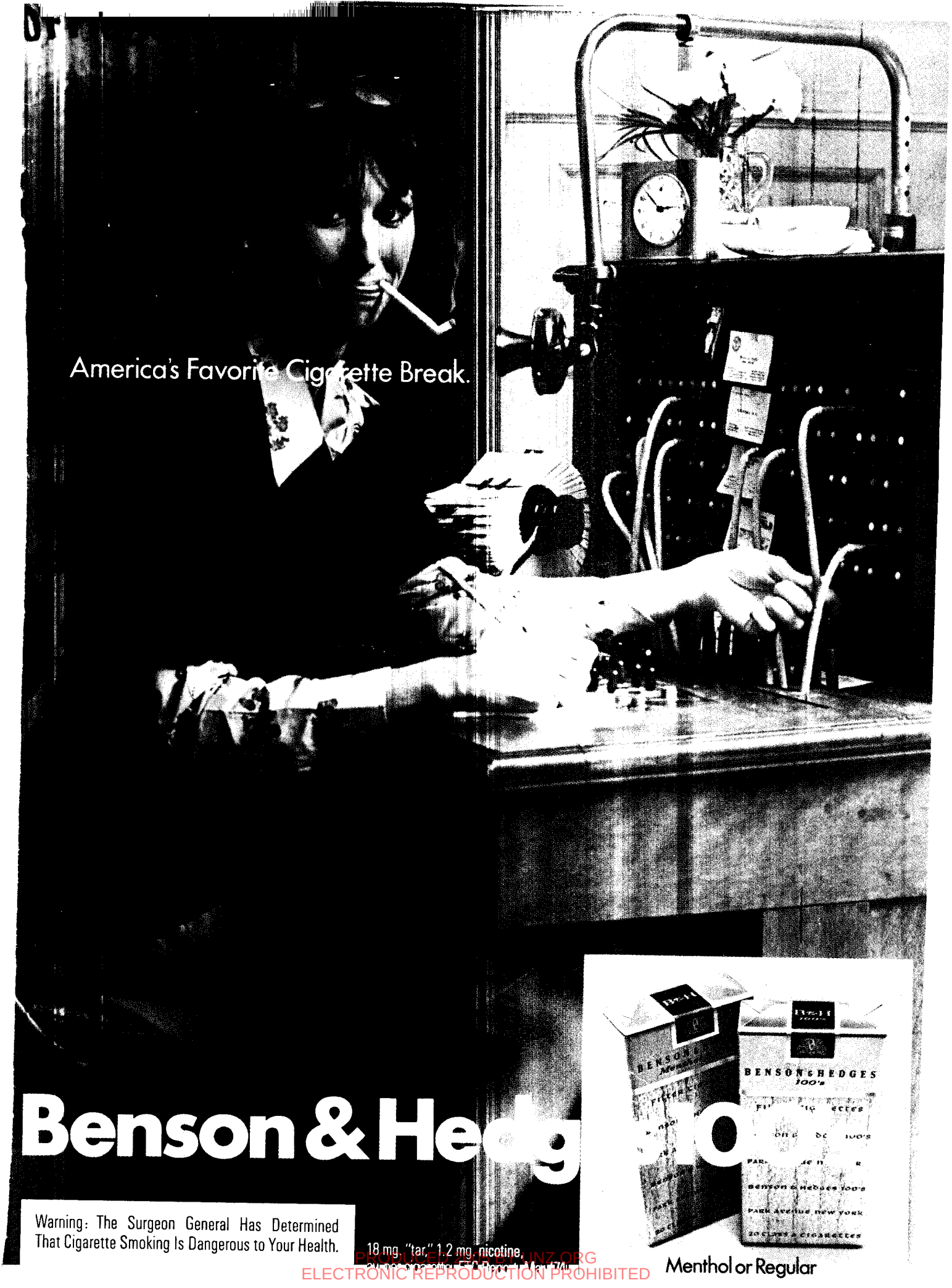

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